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**News**

All that's new in the ever expanding world of the Electron.

5

**Beginners**

How modular methods can make writing your own programs easier.

10

**Software Surgery**

Our impartial appraisal of the latest software releases including Frankenstein 2000, The Quill, Thrust and many more.

13

**HOWZAT!**

Try not to get caught out in this vivid recreation of a day's test cricket.

17

**View Driver**

Ring the typographical changes in View with this invaluable printer driver.

21

**MicroLink****News**

A monthly update on the increasing potential of Britain's national on-line database.

26

**Merlin's Cave**

More hints and tips for adventurers from our resident wizard.

44

**Micro Messages**

The pages you write yourselves. Your ideas on the Electron scene make fascinating reading.

47

**Graphics**

Discover the Electron's two very different ways of looking at the screen - one for text and one for graphics.

54

**TextEd**

Convert your computer into a versatile electronic typewriter with this powerful utility.

35

**Formula 1**

Cunning techniques to speed up your Electron by up to 230 per cent.

40

**Education**

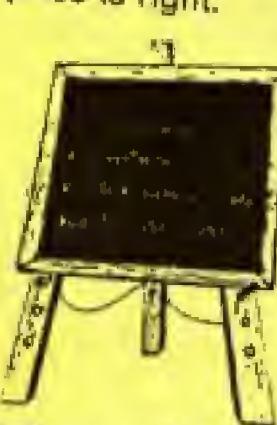
What do children benefit from learning Basic programming? We Investigate.

29

**3D Maze**

After a night on the tiles you wake up trapped in a twisty maze, where a hangover's the least of your problems ...

31

**Bargains galore!**

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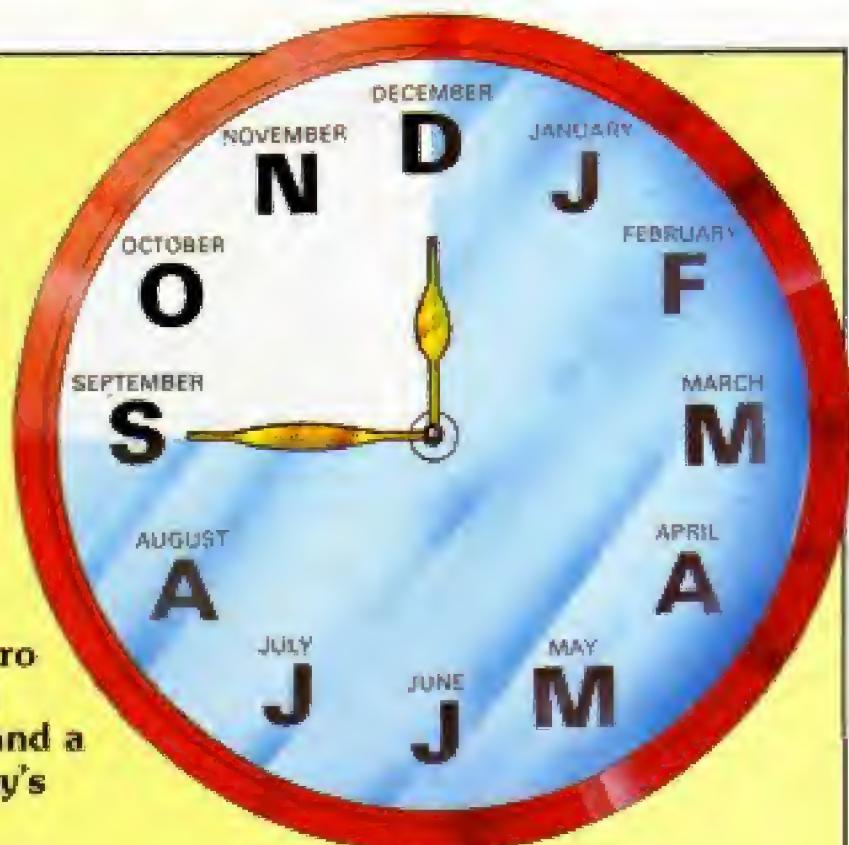
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# Yes - it's bargain-hunting time again!

For BBC Micro and Electron users this is the start of the top buying period of the year - the time when they stock up with all the latest hardware and software that will enhance the versatility, power - and just sheer fun! - of their micros.

And the ideal time to hold the Electron & BBC Micro User Show, where they get the best of both worlds - a first look at all the fascinating new-season products, and a chance to pick up really worthwhile bargains as yesterday's top sellers are sold at rock-bottom prices!



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# electron NEWS

## £250 prize challenge for gamers

CHART-TOPPING game Thrust has been released for the Electron by Superior Software.

Part of the promotion is £250 in cash prizes — £200 for the winner — for the first to complete all 24 screens of the game.

Sales manager Ken Campbell said: "Never before have I experienced such excitement for an Electron game. We have had our fair share of chart hits but this one seems to beat the lot".

Managing director Richard Hanson, said: "The launch of Thrust marks the start of a series of major releases from the company".

The dual cassette costs £7.95.

## A heart searcher

IN Imagine's new game for the Electron, Mikie, the player faces a load of heart searching.

The game is set in an American school with Mikie combating obstructions while searching for hearts hidden in various departments.

With each heart there is a letter, and when all are collected they form a sentence for him to open a secret door which eventually leads to his girl friend.

The cassette costs £8.95 and the disc £12.95.

## BBC Micro power for the Electron?

**A DRAMATIC increase in the overall performance of the Electron has been achieved as a result of two technological breakthroughs in the last six months.**

So much so that independent experts are now claiming that the two add-ons combined make the machine "as compatible as possible" with the BBC Micro and the Master series.

Yet the cost of the complete package —

including the Electron itself — would still be less than £230.

Known as the AP4 and the AP5, both peripherals come from Advanced Computer Products, the Yorkshire-based development company.

First to be launched was the AP4, a disc interface which opened up the Electron to a vast pool of software previously restricted to the BBC Micro. It features 1770 DFS as

standard running with page at £600 and costs £69.95.

Now ACP has informed *Electron User* that it is soon to unveil the AP5 which will effectively add three more interfaces to the machine.

It combines a 1 MHz bus, user port providing the same I/O as the BBC Micro and a Tube interface, and is likely to cost in the region of £60.

The user port will allow the Electron to

control external devices such as robots, although special software will need to be written in each case.

ACP has already made AP5 capable of running the critically acclaimed AMX Mouse and its accompanying computer aided drawing package AMX Art.

The Tube interface will allow Acorn's second processor to be connected to the Electron for the first time.

This will provide a major boost in speed for the machine, in theory making it as fast as the BBC Micro.

### 60k extra

It will also create additional memory — some 40k of usable RAM in Basic and more than 60k for machine code.

"All this is part of our policy of reinforcing the Electron's position in the market", said John Huddlestane of ACP.

"And it seems to be working. Since we launched the AP4 we have in fact had to quadruple production.

"So there are obviously a lot of people out there wanting to make the most out of their machines".



TELEVISION star Fred Harris's love affair with the Electron continues. The former teacher who went on to become a household name in such programmes as *Me and My Micro* and *Micro Live* has recently bought his second Electron. "It's a very underrated and highly capable machine," he told *Electron User*.



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with the I/O processor is required. The E2P Operating System, which controls the Second Processor, fully implements the Acorn TUBE protocols. Software written obeying these protocols will run in the E2P. The default language in the Electron is automatically copied into the E2P, on a CTR-BREAK and certain other languages (eg HIBASIC) can be directly \*LOADed into the E2P. The Electron version of HIBASIC, which gives 45K free, can be obtained from PMS. The E2P will work in conjunction with the Slogger Turbo, and makes the Electron/E2P even faster!! The E2P is compatible with the PLUS 3 and Cumana disk interfaces.

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*"The AP4 should be considered the standard interface for the Electron". Acorn User, July '86*

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DO you remember dealing with subroutines - sections of programs that can be used over and over again from the main program?

This is done courtesy of the keywords GOSUB, which sends the program to a subroutine, and RETURN, which sends control back to the main program.

We even saw how one subroutine can call another.

This month the subject is once again subroutines, as you'll see if you take a look at Program I.

In this case the program is more subroutine than anything else. Line 30 calls the sub-

```
10 REM Program I
20 silly = 100
30 GOSUB silly
40 END
100 REM a silly subroutine
110 PRINT "This is a silly subroutine"
120 GOSUB silly
130 RETURN
```

Program I

routine and, as it so rightly says, it is a very silly one indeed.

All it does is print the message and then GOSUB 100s again. In other words the subroutine is called again from within itself. While we might find this mind-boggling the Electron takes it in its stride.

The program goes to line 100 as instructed and starts again from there. Line 100 prints the message and the next line calls the subroutine once more.

This happens over and over again. Notice that the program never meets the RETURN of line 130, as the previous line always sends the program off round the subroutine again. The result of all this is that a series of:

, This is a silly message

message appear. And then things grind to a halt with a:

Too many GOSUBs at line 120

The program has disappeared up its own subroutine. What's happened is that the

# Using your stubs makes good sense

**PETE BIBBY** takes another look at the intricate delights of subroutine calls

micro has exceeded the number of subroutine calls the Electron can handle.

As we learnt last time, after each GOSUB the computer makes a note of the next line number so that it can find its way back after it meets a RETURN.

But, as we've seen, in this case the program never meets a RETURN. There's only so much memory available to keep track of the return addresses and when this is eventually used up the program crashes.

However don't let this put you off having subroutines call themselves - it can be a very powerful technique, so long as you stop the process before the memory gets full. Program II shows the technique.

The program uses the numeric variable count to keep track of the number of times that the subroutine calls itself.

So long as count is less than 10 the IF of line 130 allows the routine to call itself. In effect it behaves like the previous program.

The crunch comes when count is equal to 10. Now the

```
10 REM Program II
20 silly = 100
30 count=0
40 GOSUB silly
50 END
100 REM a silly subroutine
110 PRINT "This is a silly subroutine"
120 count=count+1
130 IF count<10 THEN GOSUB silly
140 RETURN
```

Program II

part after the IF is ignored, so the GOSUB isn't obeyed. The program goes on to the next line and finds a RETURN.

This tells it to go back to the line following the GOSUB that called that subroutine. Well the line that called it was line 130, so the line after it is line 140. And this is a RETURN, so the whole process begins again.

This happens nine times in all as the program keeps hitting the RETURN of line 140 and the subroutines unwind.

Finally the last RETURN sends the program not to line 140, but to line 50, which is the one after the original subroutine call. As this is an END the program stops.

Don't worry if you find that a little difficult. It's one of those concepts that takes time to sink in. It's worth the mental effort though for it allows us to use a powerful programming technique known as recursion.

If you feel like you want to know more about that have a look at Notebook in the April 1986 *Electron User* but not before you've thrilled to the unique delights of Program III.

Take a close look at the subroutine defined between lines 100 and 150. Can you see anything unusual? If you can't, try counting the number of RETURNS. There are two instead of our usual one. Let's see how it works.

The first lines of the program just ask your age and store it in age. Then the subroutine is called and the program goes to line 100.

Ignoring the REM it moves on to the next lines, displays the message and moves onto line 130. What happens now depends on the value of age.

If age is less than 18 the

condition is true and the instruction after the IF of line 130 is obeyed.

Since this is a RETURN it means that if age is less than 18 the subroutine ends at that point. However should age be 18 or over the condition is false and line 130 is effectively ignored.

In this case the program goes on to lines 140 and 150, printing a second message for those over 18 who can legally buy a pint. The RETURN of line 160 ends the routine.

So that's how you can have more than one RETURN in a subroutine. In fact you could have a whole battery of them, tucked away behind IF statements.

However no matter how many you have the first condition that's true brings into play the RETURN that ends the subroutine. Try adding further messages to the subroutine in Program III.

```
10 REM Program III
20 messages=100
30 PRINT "How old are yo
u?"
40 INPUT age
50 GOSUB messages
60 END
100 REM messages
110 PRINT
120 PRINT "No matter what
your age, if you can read,
you can read this magazine
."
130 IF age<18 THEN RETURN
140 PRINT
150 PRINT "Why not read i
t in the pub with a pint?"
160 RETURN
```

Program III

aimed at the over 40s and over 60s.

As a word of warning never use a GOTO to jump out of a subroutine, as madness lies that way. Always use RETURN.

That's where we'll leave the mechanisms of subroutines and go on to see how they can help us create programs that work.

To do this let's suppose that we want to write a very simple program that just takes two numbers, multiplies them and gives the result. Almost immediately you should be able to see that the program divides naturally into three areas:

**get the numbers  
do the calculation  
display the results**

and each of these tasks could be handled by a separate subroutine, such as:

**GOSUB get the numbers  
GOSUB do the calculation  
GOSUB display the results**

This leads naturally to something like Program IV.

It's fairly obvious what's happening. The lines from 10

```
10 REM Program IV
20 GOSUB 100:REM get the
numbers
30 GOSUB 200:REM do the
calculations
40 GOSUB 300:REM display
the result
99 END
100 REM get the numbers
110 PRINT "get the number
"
199 RETURN
200 REM do the calculatio
ns
210 PRINT "do the calcula
tions"
299 RETURN
300 REM display the resu
lt
310 PRINT "display the resu
lt"
399 RETURN
```

Program IV

to 99 form the main part of the program, containing our three subroutine calls.

The subroutines themselves are to be found in lines 100 to 199, 200 to 299, and 300 to 399. Notice how I've arranged that the subroutines start on a "hundreds" line number and end with a RETURN on a "ninety nine" number. Also notice that at present they do nothing but display what they are supposed to do.

Be that as it may, Program IV is one that works. Not only have we constructed it logically using subroutines, but we can also run it and check that it is performing as we expected and that the subroutines occur in the right order.

In this example it's easy enough to see what will happen without bothering to run the program, but imagine what it would be like if the subroutines called other subroutines, or even themselves.

This use of dummy subroutines - or stubs, as they are

known - comes in handy for keeping track of a program's logic and checking that it makes sense before spending a lot of time on the actual coding.

Once we've got a listing in the form of Program IV we can go on to make our programming life simpler by practising the age old technique of divide and conquer.

Obviously we need to put some proper working code into the subroutines to replace the messages, but rather than attempt to write all the subroutines at once let's take one at a time.

This not only makes the task less daunting, it also allows us to test each stage separately.

After all if we code all three subroutines at one time and then find that there's a mistake in the program the mistake could be in any of the subroutines.

If we only code one routine at a time and then test run the program if there's a mistake it must be something to do with that routine. The error becomes easier to track down and correct. Program V shows the results of this approach.

Here line 110 to 140 have replaced the previous stub. The result is that the subroutine now collects two numbers and stores them in *first* and *second*. This part of the program can now be tested and seen to work. If necessary temporary lines such as:

**145 PRINT first,second**

can be added to make it clearer what's happening. As a rule I always number these test lines with a line number ending with 5. This makes them easier to spot and delete in the final tried-and-tested listing.

Once we're sure that the first subroutine has done its job we can continue in the same fashion. One by one we code the following subroutines, testing each one as they are written. In the end we'll have a program such as Program VI.

This does the task asked

```
10 REM Program V
20 GOSUB 100:REM get the
numbers
30 GOSUB 200:REM do the
calculations
40 GOSUB 300:REM display
the result
99 END
100 REM get the numbers
110 PRINT "Give me the fi
rst number"
120 INPUT first
130 PRINT "Give me the se
cond number"
140 INPUT second
199 RETURN
200 REM do the calculatio
ns
210 PRINT "do the calcula
tions"
299 RETURN
300 REM display the resu
lt
310 PRINT "display the resu
lt"
399 RETURN
```

Program V

```
10 REM Program VI
20 GOSUB 100:REM get the
numbers
30 GOSUB 200:REM do the
calculations
40 GOSUB 300:REM display
the result
99 END
100 REM get the numbers
110 PRINT "Give me the fi
rst number"
120 INPUT first
130 PRINT "Give me the se
cond number"
140 INPUT second
199 RETURN
200 REM do the calculatio
ns
210 result=first*second
299 RETURN
300 REM display the resu
lt
310 PRINT first " times "
second" is "result
399 RETURN
```

Program VI

and, from the fairly logical task by task way it was created, we can be fairly confident that it will work. Also in this modular form, as it's known, the program is easy to change.

Suppose that now we had to take the two numbers and multiply the first by 10, the second by 12 and subtract one from the other.

All we'd have to do would be to change the expression in the second subroutine and the message in the third. The rest of the program would remain unaltered.

It's the same if we decided that *first* and *second* could only take values between 1 and 10. All we have to do is slot in another subroutine as Program VII shows.

Now the program has a new subroutine call at line 150. This calls the subroutine defined following lines 400 which just uses a compound condition to check that both numbers are in range. If they're not they have to be

# Beginners

## From Page 11

re-entered.

I think you'll agree that this modular method of writing programs makes things easier. Taking things one at a time

allows even the most modestly gifted programmer to write quite complex routines with a minimum of errors.

If you find a better way of doing things later you can go

```
10 REM Program VII
20 GOSUB 100:REM get the
numbers
30 GOSUB 200:REM do the
calculations
40 GOSUB 300:REM display
the result
99 END
100 REM get the numbers
110 PRINT "Give me the fi
rst number"
120 INPUT first
130 PRINT "Give me the se
cond number"
140 INPUT second
150 GOSUB 400:REM check t
```

```
he range
199 RETURN
200 REM do the calculatio
ns
210 result=first+second
299 RETURN
300 REM display the resul
t
310 PRINT first " times "
;second" is "result
399 RETURN
400 REM check the range
410 IF first<0 OR first>
0 OR second<0 OR second>10
THEN GOSUB 100
420 RETURN
```

Program VII

back to the appropriate subroutine and modify it.

We'll finish this month with an example of how stubs can help to find program errors. Have a look at Program VIII.

This seems to be a program that simply decides whether or not you can vote, but in practice there might be all sorts of information in the subroutines — when you'll be eligible to vote, where you can vote and so on.

Yet it has a fault. Try entering test values into the program and see what happens.

The problem lies in the fact that when you have age equal to 18, neither subroutine is called. That value of age drops through the conditions. Obviously the condition in line 50 should be  $\geq$  rather than  $>$ .

So as you can see stubs not only help you write programs more easily, but with the right test data they can also spot mistakes before you waste a

```
10 REM Program VIII
20 PRINT "What's your ag
e?"
30 INPUT age
40 IF age<18 THEN GOSUB
100:REM Too young
50 IF age>18 THEN GOSUB
200:REM Can vote
60 END
100 REM Too young
110 PRINT age " is too yo
ung"
199 RETURN
200 REM Can vote
210 PRINT age " can vote"
299 RETURN
```

Program VIII

lot of time and trouble coding.

● *That's where we'll finish for now. Try the divide and conquer method of programming for yourself — you'll soon see how it helps your programs improve. Next month we'll look at procedures.*

## JOYSTICKS— THE COMPLETE SOLUTION



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## Can you apply the brakes?

**Program:** Loony Loco

**Price:** £4.95

**Supplier:** Kansas City Systems, Unit 3,  
Sutton Springs Wood, Chesterfield  
S44 5XF. Tel: 0246 850357

IN Loony Loco the evil baron will stop at nothing to destroy the train. You play the part of the hero who must outwit the enemy and apply the brakes.

That little story is used by Karisus to link together four activities, all with a railway flavour.

In the first activity you drive an engine along a track with the scenery scrolling past in the background. To make life difficult for you airships and planes keep flying over and dropping bombs.

A well directed puff of smoke is required to prevent these from causing a disaster.

Also causing problems are runaway trucks. These can be avoided by firing a harpoon at them or by switching tracks at the numerous points along the way.

When you reach your destination you

progress to the next part of the game. In this you are running along on top of the carriages.

Not only do you have to leap smartly from coach to coach, but you must also jump over the balls which are rolling along, and duck under the arrows that are fired at you.

Your aim is to reach the buffet car to gain access to screen three.

Once in the buffet car you must catch the cups and saucers that are rolling along conveyors.

The kindly railway management will allow you to drop a maximum of three while trying to catch the required 40.

Screen four is quite different from the others in that it is a logic problem, requiring you to set the eight switches to put the train's brakes on.

The trouble is you can only move switch eight if the other seven are correctly set and so on.

You are allowed 300 moves, and at first you'll need them. I think the lowest possible number of moves is 170.

Loony Loco is the best program I have



seen from Kansas City Systems. Screens one and two are fast and furious arcade action with good smooth graphics and useful sound effects.

Screen three is the weakest because the cups come in a soon predictable set pattern. The fourth screen is great fun to crack, but once learned it is no problem.

You can start the game on the screen of your choice. Overall it is a first-rate package and highly recommended.

Rog Frost

Sound .....	6
Graphics .....	8
Playability .....	8
Value for money .....	10
Overall .....	8

## Creating adventures made easy

**Program:** The Quill

**Price:** £16.95

**Supplier:** Gilsoft, 2 Park Crescent, Barry,  
South Glamorgan CF6 8HD. Tel: 0446  
732765

GILSOFT are modest enough to call The Quill an adventure writer's utility. I would go a lot further than that. If you can't program in machine code then the Quill is an absolute must!

Although an adventure creator it produces machine code games. It consists of two parts — a database editor and an interpreter.

The main menu controls access to all the utilities you need, such as saving, testing and loading your creation.

Sub-menus cover printing, amending and inserting all the text, movement and status values for your adventure.

Your adventure is created using the tables which are available from the main menu.

Text is selected from the main menu, then from the sub-menu you can either insert new text with or without specifying a location, or amend text already entered.

After entering your text you are returned to the sub-menu and can then view it or get a printout.

Aside from text you also need to insert the data relating to the events that take place during the course of the game and this is done via three further tables —

movement, event and status.

The movement table is used to set the directions for each location and the room that each move will take the player to.

The event table specifies the actions the interpreter has to take to reply to a player's command, such as deciding whether an object can be dropped before allowing a player to DROP it.

The status table contains the entries handled by the interpreter that are independent of player input, such as keeping track of the player's inventory as he moves from location to location.

It is possible to assign synonyms by giving them the same word value. A random function of especial interest to Dungeons and Dragons fans, is incorporated by the implementation of a CHANCE command.

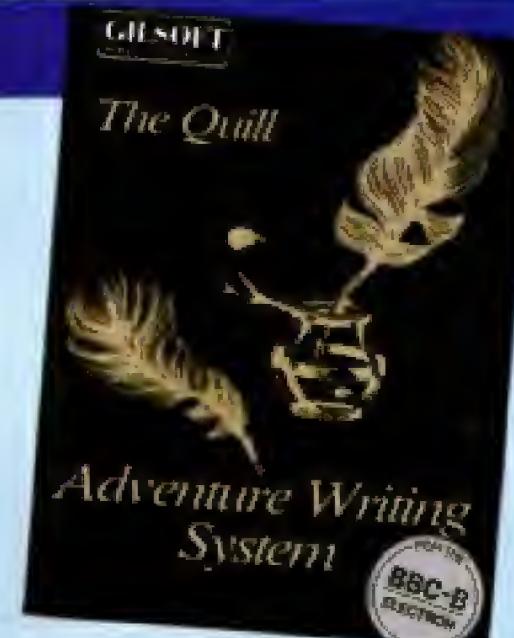
It is also possible to use up to 64 flags for situations that can occur during playing of the game.

They are simply variables that control situations and objects, such as whether or not a room is lit or how many objects a player is carrying.

The Quill allows a maximum of 253 locations and about the same number of objects and messages, so it is possible to create a lengthy adventure.

However if you go for large amounts of text you will find that memory limitations will affect the size of your adventure.

It is possible to save your creation in two ways, either as a database — in which



case you can load it back in and test it at a future time, or as a completed adventure in which case the interpreter is saved as well.

When saved as a completed adventure it will run independently of The Quill and Gilsoft have no objection to you marketing it provided you credit them with having used The Quill to produce it.

It is an absolute godsend to people who have the imagination, but not the programming ability, to create adventures. I simply cannot recommend it highly enough.

Paul Gardener

Documentation .....	8
Ease of use .....	9
Value for money .....	10
Overall .....	9

## Getting into Frankenstein's mind

Program: *Frankenstein 2000*

Price: £6.95

Supplier: Audiogenic, 12 Chiltern Enterprise Centre, Station Road, Theale, Berks. RG7 4AA. Tel: 0734 303663

IN *Frankenstein 2000* your aim is to revive the famous old monster which you have found on inheriting the infamous baron's castle.

In the futuristic world of 2000 AD your method is to shrink yourself down to a tiny size and enter the monster's body.

Stage one finds you in the monster's throat which is full of frogs. Your task is to destroy as many of these as possible during your journey downwards.

This is best described as a version of *Space Invaders*. As you travel you will sustain damage from colliding with frogs or the throat walls.

You will also use up oxygen. Too much of the first or too little of the second spells the end of your mission.

Before reaching the lungs a pellet of

oxygen must be shot. If you take a long time to hit it you won't have much oxygen for the next stage.

The activity in the lungs is very similar to the frogs in the throat, but here it is cigarette packets you must shoot. An added hindrance is bubbles of carbon dioxide which float up towards you.

After shooting another oxygen pellet you reach the heart where you steer through the various cavities to activate the implant.

It requires careful timing to get past the electrical impulses and to slip through the valves as they open.

A rather unpleasant task faces you in the stomach. You have to shoot the slices of greasy bacon, while avoiding the fried eggs.

Finally you reach the brain where, if you've got the oxygen supplies and a minimum of damage, you can knock out the bad neurons. This requires real precision, and I have not yet managed to do it. Audiogenic has an original idea with



this game, but it doesn't quite succeed.

Technically it's all fine with neat, fast graphics and it has pleasing sound effects.

However the whole program lacks any kind of extra feature to make it stand out from the crowd.

Rog Frost

Sound .....	6
Graphics .....	7
Playability .....	5
Value for money .....	5
Overall .....	5

## Cracking fun at the towers

Program: *Crack It! Towers*

Price: £8.95

Supplier: Mirrorsoft, Maxwell House, 74 Worship Street, London EC2A 2EN. Tel: 01-377 4600

**CRACK IT!** Towers describes itself as a puzzle game for all ages. Mirrorsoft have done well to think of some kind of explanation because it's far easier to say what the program is not.

It certainly is not an arcade game or an adventure. It has educational elements, but it isn't a learning program.

What is it then? It's a whole load of fun for Electron and BBC Micro owners.

The aim is simply to find the secret of Count Crack It! You must collect seven golden keys which you'll need to open the eighth room in his castle.

To gain the seven keys you must visit various rooms and solve a set of puzzles and problems in each.

In room 1 in the castle you try to discover what Oswald eats for lunch. This can best be described as a hangman type game.

Success will earn you a key while failure will pitch you into the moat. If you end up in the moat the piranha will start swimming towards you.

A question such as 184 divided by 4 will flash on the screen. A correct answer will stop the fish and you will survive to visit more rooms.

Room 2 features a logic game in which you must shoot some beasties while

trying to avoid shooting yourself. It's a version of the ancient game of Nim and it's easy to make mistakes.

Room 3 looks a bit like space invaders, but with bats bombing you. Before you can fire back you need to match a subtraction sum with its correct answer.

This room is fiendish, requiring you to concentrate on three different areas of the screen, do a calculation and keep your base away from the bombs.

The castle swimming pool can be found in room 4. It will come as no surprise to learn that the Evil Count Crack It! keeps sharks in it.

To avoid them you will have to add a number to a sequence such as 5, 10, 15, 20 and so on.

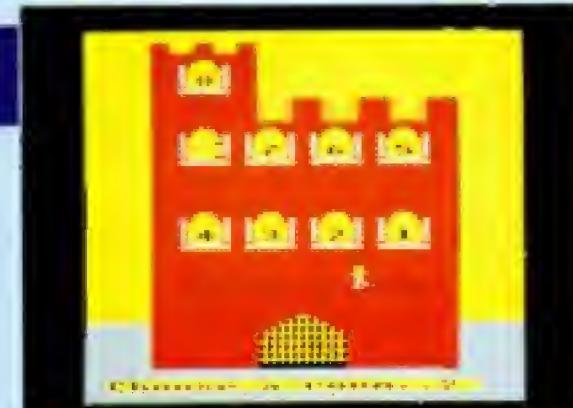
Room 5 is the spiders' playroom. You have to move your stick of dynamite around to make a spider fall on it, but before any spider falls you must get a multiplication sum correct.

On to room 6 where Albert the Alien lives – in a minefield. In a limited time you must issue commands such as "west 3" to steer him to safety.

Room 7 features ghosts who won't destroy you if you are quick enough at solving an anagram.

You can enter the rooms in any order, but they all need unlocking by adding a set of numbers together.

If you succeed in any room you can try for a bonus key by entering the maze of 17 skulls. If you pick on the right skull, aided by a devious clue, you win. The



Count keeps many more nasty friends who leap out at unexpected moments and steal precious keys or put you into prison.

Some of these can be stopped by hitting Space, but others require you to complete words or solve number problems very quickly.

If you get fed up with the words defined in the program you can enter your own selection.

My whole family have found this an addictive program. None of the tasks are difficult in themselves, but to succeed you will need fast reflexes and an alert brain.

Mirrorsoft has come up with something quite out of the ordinary and for my money, it's a real winner.

Rog Frost

Sound .....	6
Graphics .....	7
Playability .....	10
Educational value .....	9
Value for money .....	9
Overall .....	9

## Compilation of the old and new

**Program:** Action Pack 2  
**Price:** £4.99  
**Supplier:** Alligata, 1 Orange Street,  
 Sheffield S1 4DW. Tel: 0742 739061

THIS collection of four games – some of them new – is only available from branches of W.H. Smith.

The first game on the tape, Video's Revenge, is a shoot-them-down space game using good quality, smooth graphics and adequate sound.

You can move your craft left or right as well as forwards and backwards, and the various nasties approach from above or below.

Like so many of these games it's simple but addictive. I really like the title screen which has a message scrolling across the screen while the game loads.

Q-Bix is a version of the classic in which you steer a character around a set of cubes, changing the colours of the top surfaces.

Of course there are adversaries who

try to bump in to you and cause you to lose one of your lives.

This game has poor graphics and is painfully slow. It will soon have you reaching for the Break key.

Tarzan Boy is an oldie and was reviewed as a single game in December 1985.

For those who missed that review Tarzan Boy is a four screen ladders and levels game, with an awful lot of problems to overcome.

Getting on to screen two is my limit in this attractive, smooth and flicker-free game. It is a little slow, but by hitting Break the game restarts with no sound, and a lot more speed.

The final game is Diamond Pete and this obviously has its origins in Repton. The aim is to collect 16 diamonds from each of 10 screens without letting any rocks fall on your head.

An added problem is the severe time limit. There are said to be 10 levels as well as the 10 screens, but I never got the chance to find out.

There is no way that this matches the



outstanding quality of Repton, but it is very good. It's smooth, fast and has good sound.

The problems are well thought out, and it provides a very good challenge.

Overall I thoroughly recommend this package. Three of the games would make excellent singles, so it is a real bargain to get all of them at such a low price.

Rog Frost

Sound .....	6
Graphics .....	8
Playability .....	9
Value for money .....	10
Overall .....	9

## Welcome back old space friend

**Program:** Thrust  
**Price:** £7.95  
**Supplier:** Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX. Tel: 0532 459453

REMEMBER the days when Space Invaders were king, and the buzz which went round the arcades when Galaxians appeared? If you do then you must buy yourself a copy of Thrust from Superior Software. Loading up Thrust was like discovering an old master in the attic.

Your spacecraft and all buildings and gun emplacements are displayed as high resolution line drawings.

The game is played as a series of missions of increasing complexity. In the first one the drive unit is on the planet's surface, along with a fuel dump, gun emplacement and nuclear reactor. In subsequent missions the drive will be located in underground caverns.

Fuel can be taken on board by hovering over the dump and activating the tractor beam. Hovering is achieved by pointing the ship away from the planet and using short bursts of thrust to counter the effects of gravity.

The gun emplacements are deadly accurate but can be taken out by a single shot. Firing at the nuclear reactor will halt the operation of the guns for a short while.

Having located the drive unit, the tractor beam can be used to tow it behind your ship, and this is where the fun really begins.

The programmer must be either an ace physicist or an articulated lorry driver, because the drive unit hangs beneath the ship like a pendulum attached to a fixed point on the ship by a solid bar.

Each movement of your craft will cause a realistic movement of the pendulum. As a pilot you must fly as smoothly as possible, counteracting every swing of the drive unit.

Should the swing become uncontrollable you will surely be dragged into a cavern wall.

The mission is completed by towing the drive unit into space and jumping into hyper space. As with every good arcade game, there is an opportunity for the arcade aces among you to earn big bonus points.

Having emerged from the cavern with drive unit in tow you can fire on the reactor until it goes critical, at which point



you have five seconds to make your hyper-space jump. This feat of bravado will earn you an additional 2000 points.

Thrust is a classic game, a game at which the natural games player will excel. This is a definite contender for my game of 1986.

Jon Revis

Sound: .....	8
Graphics: .....	9
Playability: .....	10
Value for money: .....	10
Overall: .....	10

## Commanding the star wars

*Program: Star Force Seven*

*Price: £2.99*

*Supplier: Bugbyte, Liberty House, 222 Regent Street, London W1R 7DB. Tel: 01-439 0666*

STAR Force Seven is a military strategy game set in a futuristic space context.

You take the part of the space fleet commander, battling for 25 planets and trying to prevent the marauding Zurgs from invading Earth.

Your first task is to decide how many of the various types of spacecraft you require. You have a limited number of points and must choose carefully between cruisers, transporters, spy ships and so on.

Having made your decision, you decide which star to visit first. There are 26 stars and, to make life easy, each starts with a different letter.

When you reach a star your main options begin. You can get intelligence reports on the size and population of the various planets.

You may move into orbit around a planet and assault it or bombard it. If there are any enemy space fleets around

you can attack them either in a random way or by picking off individual craft.

If the pressure gets too much for you you can do a star jump and hope to find somewhere safer and quieter.

This is not an arcade type of game so there is no graphic action which you control. You make general decisions and the computer then carries out the action.

When you are battling to win a planet the display consists of the numbers of troops remaining, both your own and those of the enemy.

I found this game rather dull to play. It looks like the kind of game that we had five or six years ago when computers had limited graphics capabilities.

It does not offer a real chance to use your own skills and relies too much on random happenings.

Another factor I disliked was that on being destroyed I had to reload data to be able to play again.

I'm afraid I even found the rather limited sound an irritant. Thankfully this can be switched out.

There are five difficulty levels ranging from easy to difficult, but even level 1 was too hard for me.

If you like this kind of strategy game no



doubt you would be pleased to add this to your collection. I'd prefer to invest my money elsewhere.

Rog Frost

<i>Sound</i>	3
<i>Graphics</i>	4
<i>Playability</i>	4
<i>Value for money</i>	6
<i>Overall</i>	4

## Rick, the supreme secret agent

*Program: Rick Hanson*

*Price: £9.95*

*Supplier: Robico, 3 Fairland Close, Llantrisant, Mid Glamorgan CF7 8QH. Tel: 0443 227354*

ROBICO is well known for the quality of its BBC adventures and so it was with some interest that I tackled its first Electron game.

You play the part of Rick Hanson, secret agent. Your mission is to assassinate General Garantz, an evil criminal who is threatening to explode a nuclear bomb in New York unless he is paid a ransom.

You begin your mission in a railway station. An initial exploration of the 14 locations surrounding you reveals several objects, all of which are useful.

A visit to the telephone box should give you further information about your mission, but reversing the charges is a throw-away line.

After collecting everything else you can find you must look for a route out of the station. Leaving by the front door is not the answer as you will soon discover.

Hesitation can also prove fatal as one

of the general's men is somewhere inside looking for you with evil intent.

To get on the right track, or rather over it, head back to the bridge. A passing train is on, and in time.

The guard should be dealt with quickly, so put a spanner in his works. Leaving the train will find you in a village with more exploring to do.

There's lots to do here and if you take a gamble in the tavern you will find you can stay the night.

You must now try not to avoid too close a shave, and cracking the code should see you well equipped to solve the remaining puzzles before leaving the village.

I am very impressed with this game. It has about 220 locations and is totally logical. Packaged with the game is a card which entitles you to help if you get stuck.

Also enclosed is a smart adventurer's notebook. This is about the size of a diary and consists of blank, coloured pages. I'm not sure how useful this is, but it does add an air of professionalism to the game.

The program uses screen memory because of its size so you only see 18 lines of text at any one time.

Rick Hanson is nothing less than



brilliant and Robico must now join Epic as being the software houses for adventures on the Electron.

I look forward to spending time on the follow-up version, Rick Hanson II, which from initial impressions seems to be every bit as good.

Paul Gardener

<i>Presentation</i>	9
<i>Atmosphere</i>	9
<i>Frustration factor</i>	9
<i>Value for money</i>	10
<i>Overall</i>	9

HOWZAT! simulates a full innings between England and Australia or teams of your choice. After entering the teams you want you must choose which players are to bowl, in order of skill. The game then begins.

Once into the game you are shown the scorecard at the beginning of each over and select a new bowler. The current batsman facing and the last bowler are highlighted.

The player controlling the fielding team should press 1 to 6 – but not the previous bowler's number – to select the new bowler. The batting player can press D to declare.

The main screen is a graphic representation of the pitch. At the top is the scoreboard showing the teams' scores, wickets lost, the batsmen's scores and the bowler.

The Electron will automatically bowl and try to hit the ball – success depends on the respective skills of the bowler and batsman. If the ball is hit the player batting will be asked if he wishes to run or not.

If he does the batsmen will dash across the wicket while the nearest fielder will attempt to run them out. LBWs, catches, bowled-outs and drops are all computer controlled.

Every time a wicket is lost the program will return to the scorecard to select the new batsman.

If you wish to have a limited overs game then simply declare after a fixed number of overs.

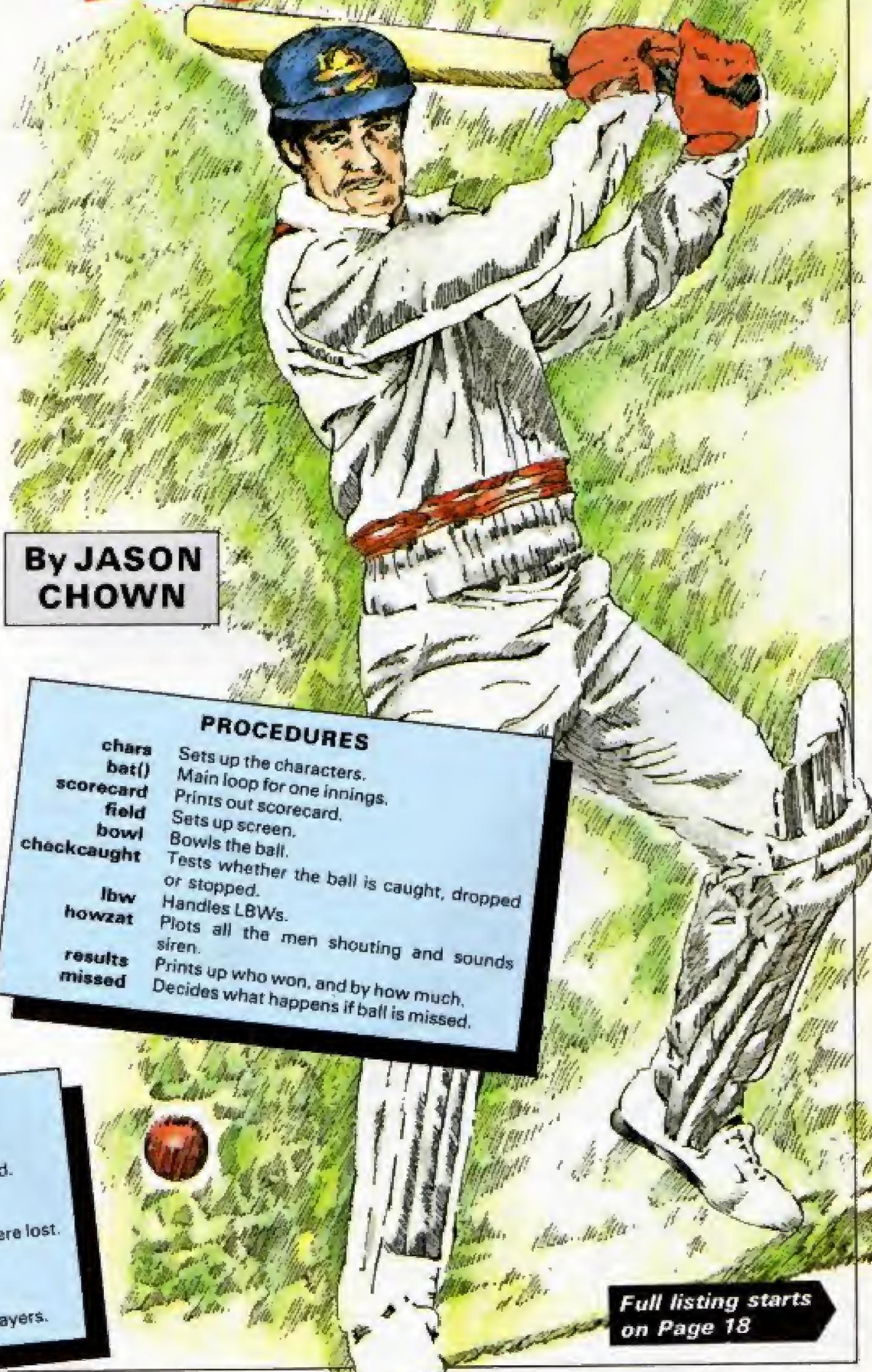
If you want to play twice – hence a two innings match – then you won't want the program to automatically declare after the second player has exceeded the first's score, so change line 670 to:

670 UNTIL wkl(TI)=10 OR  
declared!

#### VARIABLES

T%	Current team.
0%	Other team.
ov%	Number of overs played.
X%,Y%	Coordinates of ball.
bt1%	Batsman facing.
W%	How many wickets were lost.
bwn%(5,1)	Bowler number.
bws%(5,1)	Bowler skill.
bts%(10,1)	Batsman skill.
n\$(11,1)	Name of team and players.

# HOWZAT!



By JASON  
CHOWN

#### PROCEDURES

chars	Sets up the characters.
bat()	Main loop for one innings.
scorecard	Prints out scorecard.
field	Sets up screen.
bowl	Bowls the ball.
checkcaught	Tests whether the ball is caught, dropped or stopped.
lbw	Handles LBWs.
howzat	Plots all the men shouting and sounds siren.
results	Prints up who won, and by how much.
missed	Decides what happens if ball is missed.

Full listing starts  
on Page 18

## Howzat listing

England after 6 overs

1: Gooch	Run out
2: Robinson	Not out
3: Gower	
4: Batting	
5: Laab	
6: Botham	O. Hilditch b. Wood
7: Downton	
8: Emburey	
9: Edmonds	
10: Ellison	
11: Taylor	
Extras:	
Total	8 for 2
Bowler	Sk Ov Mdns Runs Wkts
1: Gooch	*** 0 0 0 0
2: Hilditch	*** 0 0 0 0
3: Hussels	*** 0 0 0 0
4: Border	*** 0 0 0 0
5: Boon	** 0 0 0 0
6: Ritchie	** 0 0 0 0

New batsman number: ?

## From Page 17

```

18 REM Howzat!
20 REM A cricket game
30 REM for two players
40 REM By Jason Chown
50 REM with ideas from
60 REM Christian Chown
70 REM (c) Electron User
80 #FX220 17
90 DATA England,Gooch,Rob
inson,Gower,Batting,Laab,Bo
tham,Downton,Emburey,Edmond
s,Ellison,Taylor
100 DATA Australia,Wood,Hil
ditch,Wessels,Border,Boon,
Ritchie,Phillips,Holland,Lau
son,O'Donnell,McDermott
110 MODE4:PROCchars
120 PRINTTAB(5,10)*Press
0 for default teams*
130 PRINTTAB(5,12)*(Engla
nd v Australia)*
140 PRINTTAB(5,14)*or I t
o input your own teams.*
150 PRINTTAB(5,17)*Please
ensure Caps lock is on.*
160 REPEATA$=GET$:UNTILA$=
="I"ORA$="D"
170 ENVELOPE1,10,1,-1,0,1
,1,0,126,0,0,-126,126,126
180 DIM n$(11,1),bwn$(5,1
),bws$(5,1),bts$(10,1),rn$(1
1,1),bwf$(5,1,3),ho$(10,1)
,wt$(1),tot$(1)
190 X=RND(-TIME)
200 CLS
210 IF A$="I"COLOUR129:COL
OURB:PRINTTAB(12,1)*ENTER N
AMES*:VDU20
220 FORTI=BT01:FORMZ=BT01
|
230 IF A$="D"READn$(MX,TX)

```

```

ELSE PROCinput
240 NEXT,
250 FORTI=BT01:MODE4:PRIN
T'TAB(15):COLOURB:COLOUR12
9:PRINTn$(0,TI):COLOUR1:COL
OUR128:PRINT'" name bat
ting skill bowling":FOR
MX=1T011
260 bts$(MX-1,TI)=(10-MX)/
21+VAL("1."+STR$(RND(9)))
270 PRINT(MI;"");n$(MX,T
I)TAB(15):STRING$(bts$(MX-1
,TI)/4+1,"")
280 NEXT
290 PRINT'
300 FOR BI=BT05:REPEATPRI
NTTAB(0,20)SPC(40)::INPUTTA
B(0,20)*Bowler number:MI
310 FI=0:FORSI=BT08:IFbw
n$(SI,TI)=NFXI=-1
320 NEXT
330 UNTILNOTFIANDNI>BANDN
I(12
340 PRINTTAB(26,NI+3)*Bow
ler no.":BI+1:bwn$(BI,TI)=N
I
350 bws$(BI,TI)=(8-BI*1.5
)+RND(4)
360 NEXT:PRINTTAB(0,30)*P
ress any key to go on..":A=
BET
370 NEXT
380 VDU23;8282;0;0;0;
390 VDU19,0,2;0;19,1,0;0;
400 PROCtossup
410 ovI=0
420 declaredI=0
430 PROCbat(0):loI=ovI
440 declaredI=0
450 PROCbat(1)
460 PROCresults
470 END
480 DEFPROCchars
490 VDU23,224,0,108,146,1
46,146,146,146,23,225,3
8,16,98,98,82,82,76,76
500 VDU23,226,0,0,0,0,56,
56,56,16,23,227,68,121,185,
56,56,48,68,66,23,228,68,12
1,185,56,56,48,48,48
510 VDU23,229,156,92,68,3
8,29,48,68,66,23,230,0,0,0,
0,112,112,112,32,23,231,112
,128,116,116,116,84,84,88,2
3,232,112,128,116,116,114,0
4,88,88,23,233,56,128,184,1
84,184,168,168,48
520 VDU23,254,0,0,0,0,1
29,153,98,23,255,98,126,68,
68,68,36,36,182
530 ENDPROC
540 DEFPROCinput
550 IF MI=0 a$="Team "+ST
R$(TI+1)+"": ELSE a$="Playe
r "+STR$MX+""
560 PRINTTAB(TI+28,MZ+4-1
,MZ):a$:
570 INPUT"n$(MX,TI)
580 ENDPROC
590 DEFPROCbat(TI)CLS
600 btI:I=1:bt2I=2:bnI=6
610 REPEATbnI=0:ho$(btI
I-1,TI)="not out":ho$(bt2I-
1,TI)="not out":PROCscoreca
rd:PROCnewbowler
620 FORbowlsI=1T06
630 IFwk$(TI)<1ANDNOT(TI
=1ANDtot$(0)<tot$(1))ANDNOT
declaredIPROCfield:PROCbowl
640 NEXT:IFNOTdeclaredI o
vI=ovI+1
650 A$=btI$:btI$=bt2$:bt2
$=A$
660 IFNOTdeclaredIPROCadd
670 UNTILwk$(TI)=10ORdeci
aredIOR(TI=1ANDtot$(0)<tot$(1))
680 PRINTTAB(0,31)*Inning
s Closed. Press any key...":A=
B$:GET:ENDPROC
690 DEFPROCscorecard
700 CLS
710 PRINTn$(0,TI);* after
*:ovI;* overs*
720 tot$(TI)=0
730 FORMI=1T011:IFM$=btI$:
COLOURB:COLOUR129ELSECOLOUR
1:COLOUR128
740 PRINT(MI;".TAB(3)n$(M
I,TI)TAB(13)ho$(M$-1,TI)TA
B(36):rn$(M$-1,TI):tot$(TI)=t
ot$(TI)+rn$(M$-1,TI):NEXT
750 COLOUR1:COLOUR128
760 PRINT"Extras":TAB(36
):rn$(0,TI)
770 tot$(TI)=tot$(TI)+rn$(0,TI)
780 PRINT"Total":TAB(38
):tot$(TI)" for ";wk$(TI)
790 IFovI<0 ANDT$=0 PRINT
" (averaging ";INT(tot
$(0)/ovI+100)/100;" an over
)"
800 IFTI=1 IFovI>loI>0 PR
INT" (averaging ";INT(tot
$(1)/(ovI-loI)+100)/100;
" an over)"
810 PRINT" Bowler
Sk Ov Mdns . Runs Wkts-
-----
820 OT=-NOTTI:IFovI>20I=0
830 FORMI=BT05:IFbnI=MZCO
LOURB:COLOUR129ELSECOLOUR1:
COLOUR128
840 PRINT(MZ+1)."TAB(2)n
$(bwn$(MX,0I),0I):TAB(12);S
TRING$(bws$(MX,0I)/3+1,"")
:TAB(18):bwf$(MX,0I,0I):TAB(2
5):bwf$(MX,0I,1I):TAB(32):b
wf$(MX,0I,2I):TAB(38):bwf$(M
X,0I,3I)
850 NEXT:COLOUR1:COLOUR12
8
860 ENDPROC
870 DEFPROCnewbowler
880 REPEATPRINTTAB(0,28)S
PC(28)TAB(0,28)*Bowler num
ber or '0' to declare..":A$=
GET$:UNTILA$="0"OR((VALA$)>
ANDVALA$(7)ANDVALA$(8)bnI+1)
890 IF A$="0"declaredI=TRU
E:ENDPROC
900 bwfx(VALA$-1,0I,0I)=bw
fx(VALA$-1,0I,0I)+1
910 bnI=VALA$-1
920 ENDPROC
930 DEFPROCfield CLS:REST
ORE 978
940 MOVE1258,200:DRAW1180
,20:DRAW188,20:DRAW38,200:D
RAW38,700:DRAW188,888:DRAW1
108,888:DRAW1250,700:DRAW12
58,200
950 PRINTTAB(10,18)CHR$12
8TAB(38,18)CHR$128
960 FORMI=BT09:READX,I,YI:
PRINTTAB(XI,YI-1)CHR$13BTAB
(XI,YI)CHR$131:NEXT
970 DATA7,28,8,21,18,23,1
3,6,18,10,31,6,7,18,31,27,2

```

```

8,25,28,14,38,28,36,28
 980 READX1,Y1,X1,Y1:PRINT
TAB(X1,Y1-1)CHR$138TAB(X1,Y
1)CHR$131
 990 PRINTTAB(28,17)CHR$13
0TAB(28,18)CHR$137TAB(12,17
)CHR$134TAB(12,18)CHR$135
 1000 ENDPROC
 1010 DEFPROCbowl
 1020 PRINTTAB(18,0)n$(0,T1
)" are ":"tot1(T1);:" for ":"w
k1(T1):IFT1=1PRINTTAB(28,1)
;tot1(0)-tot1(1)+1;" to win
-
 1030 PRINTTAB(8,1)n$(bt1X,
TX)TAB(12);rn1(bt1X,T1)'n$(
bt2X,T1);TAB(12);rn1(bt2X,T
1)
 1040 PRINTTAB(15,2)n$(bt1X
,T1)" facing "n$(bwn1(bn1,0
),0X)
 1050 PRINTTAB(1,38);bowlsZ
 1060 FORZ1=36TO38STEP-1:PR
INTTAB(Z1,19)CHR$138TAB(Z1,
28)CHR$131TAB(Z1+1,19)" "TA
B(Z1+1,28)" ";FORZ1=1TO1000
:NEIT,
 1070 PRINTTAB(38,19)CHR$13
0TAB(38,28)CHR$133
 1080 pace1X=68-bws1(bn1,T1)
+b1:IFpace1X<0 pace1=0
 1090 FORBX=95TO480STEP-16
:PROCball(B1,450-B1/15):6C0
L0,B:PROCball(B1+16,450-(B1
+16)/15):FORZ1=1TOPace1:NEX
T:6COL8,1:NEIT
 1100 PROChit
 1110 ENDPROC
 1120 DEFPROCxit:PRINTTAB(1
2,18)CHR$136
 1130 *FI15
 1140 SOUND0,-10,2,3
 1150 out1=0
 1160 Z1=TRUE
 1170 IFRND(40)=1AND(bts1(b
t1Z-1,T1)+10+RND(20))<(bws1
(bn1,0X)+RND(20)):PROCdout:
1Z=0
 1180 IFbts1(bt1Z-1,T1)+RND
(20)>38AND1X PROCbighit:1Z=
0
 1190 IFbts1(bt1Z-1,T1)+RND
(20)>17AND1X PROCdinky
 1200 IF1XPROCmissed
 1210 IFout1PROCnewman
 1220 Z=RND(-TIME)
 1230 ENDPROC
 1240 DEFPROCdinky 1Z=0:PRO
Csmallhit

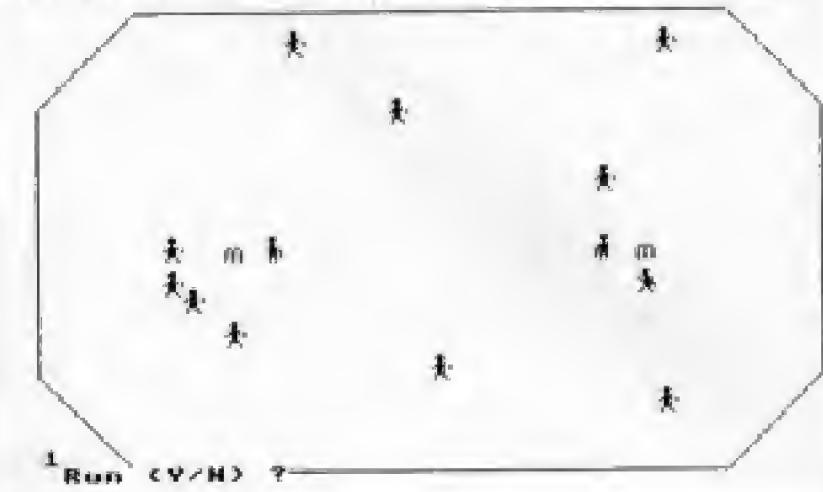
```

```

1250 IF X1>100ANDX1<117AND
Y1>100ANDY1<88BANDNOTout1
PROCrunning ELSE IF NOTout1
PROCadd2(4):PRINTTAB(18,3)
"FOUR RUNS!":A=INKEY(388)
 1260 ENDPROC
 1270 DEFPROCbighit A=RADRN
D(360)
 1280 IFRND(18)=1PROCsix:EN
DPROC
 1290 x1=20+COSA:y1=20+SINA
 1300 X1=480+x1+y1:Y1=448+y
1+y1
 1310 6COL3,1:PROCball(X1,Y
1)
 1320 REPEAT
 1330 PROCball(X1,Y1)
 1340 X1=X1+x1:Y1=Y1+y1
 1350 A=INKEY(1)
 1360 PROCball(X1,Y1)
 1370 UNTILPOINT(X1+x1,Y1+y
1)<>0
 1380 IFPOINT(X1+x1,Y1+y1)=
1ANDX1>200ANDX1<1036ANDY1>
38ANDY1<88PROCcheckcaught:
1I=0:IFNOTout1PROCrunning:E
NDPROC
 1390 IFPOINT(X1+x1,Y1+y1)=
1 ANDY1<88PROCrunning:END
PROC
 1400 IF1X=0ENDPROC
 1410 REPEAT
 1420 PROCball(X1,Y1)
 1430 X1=X1+x1:Y1=Y1+y1
 1440 A=INKEY(1)
 1450 PROCball(X1,Y1)
 1460 UNTILPOINT(X1+x1,Y1+y
1)<>0:R=1=0
 1470 QRY1>880
 1470 PRINTTAB(18,3)"FOUR R
UNS!""
 1480 tot1(T1)=tot1(T1)+4:I
FABS(y1)<18ANDy1<-18PRINTTA
B(15,4)"extras":rn1(0,TX)
=rn1(0,T1)+4ELSErn1(bt1Z,T1
)=rn1(bt1X,TX)+4:runs1=runs
1+4
 1490 A=INKEY(488)
 1500 ENDPROC
 1510 DEFPROCsix
 1520 x1=20+COSA:y1=20+SINA
 1530 X1=480+x1+y1:Y1=448+y
1+y1
 1540 6COL3,1
 1550 PROCball(X1,Y1)
 1560 REPEAT
 1570 PROCball(X1,Y1)
 1580 X1=X1+x1:Y1=Y1+y1
 1590 A=INKEY(1)
 1600 PROCball(X1,Y1)

```

Helditch      *Note: ratios are 0 for 4  
Helditch facing Botham*



```

 1610 UNTILPOINT(X1+x1,Y1+y
1)=TRUE
 1620 PROCadd2(6)
 1630 PRINTTAB(18,3)" S 1 I
R U N S !"
 1640 SOUND1,1,56,48
 1650 A=INKEY(488):ENDPROC
 1660 DEFPROCsmallhit A=RAD
RND(360)
 1670 x1=20+COSA:y1=20+SINA
 1680 X1=480+x1+y1:Y1=448+y
1+y1
 1690 6COL3,1
 1700 PROCball(X1,Y1)
 1710 REPEAT
 1720 PROCball(X1,Y1)
 1730 X1=X1+x1:Y1=Y1+y1
 1740 PROCball(X1,Y1)
 1750 A=INKEY(3)
 1760 aI=RND(6):UNTILPOINT(
X1+x1,Y1+y1)<>0:R=aI=0
 1770 IFPOINT(X1+x1,Y1+y1)<
>8ANDX1>100ANDX1<117ANDY1>
100ANDY1<88PROCcheckcaught:
:ENDPROC
 1780 ENDPROC
 1790 DEFPROCdout
 1800 1I=0
 1810 IFRND(6)=1PROCdinky:E
NDPROC
 1820 IFRND(4)=1PROCkeeper:
ENDPROC
 1830 IFRND(4):ENDPROC
 1840 IF(bts1(bt1Z-1,T1)+10
+RND(20))<(bws1(bn1,0X)+RND
(20)):PROCbowled
 1850 IFRND(18)=1PROCbowled:EN
DPROC
 1860 ENDPROC
 1870 DEFPROCkeeper:PRINTTA
B(18,3)"Wicket Keeper";:A=I
NKEY(188):1I=0:ENDPROC
 1880 DEFPROCcheckcaught IF

```

## Howzat listing

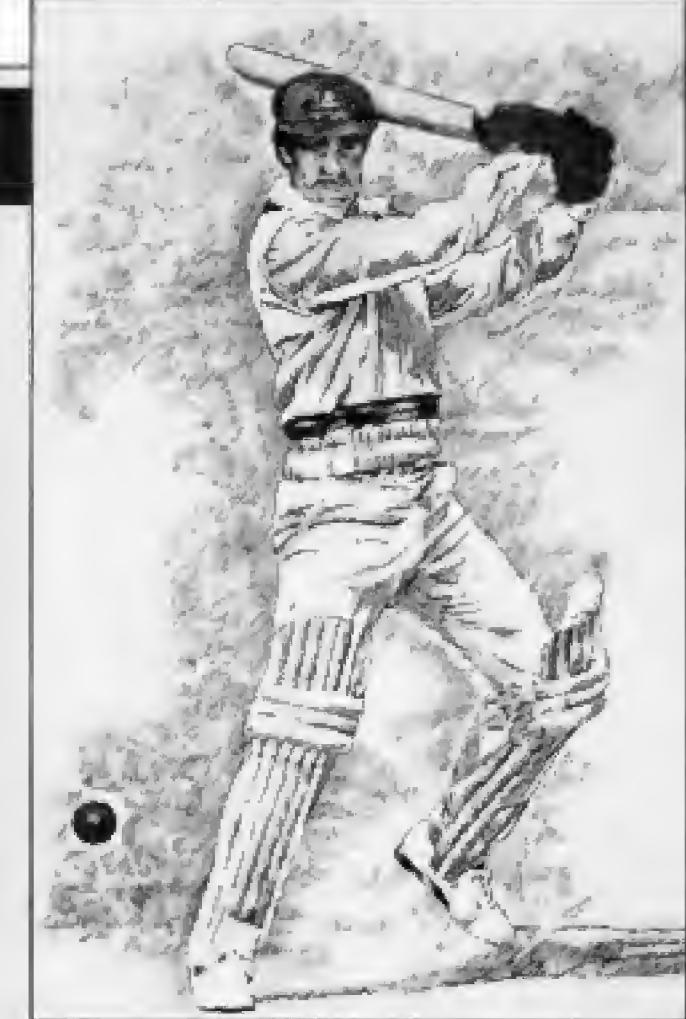
### From Page 19

```

2110 ENDPROC
2120 DEFPROCcaught RESTORE
970
2130 PROCfnear
2140 n$=n$(NZ+1,0X)
2150 IFn$=n$(bwn$(bn$,0X),
01)PROCrndman
2160 IFNZ=10A$="c & b "+n$(
bwn$(bn$,0X),0X)ELSEA$="c,
"+n$+" b."+n$(bwn$(bn$,0X),
0X)
2170 PROChowzat
2180 PRINTTAB(0,30)"HOWZAT
! ("A$")'"Press any key...
";:out$=-1:ho$(bt1$-1,T$)=A
$:A=GET:ENDPROC
2190 DEFPROCrndman
2200 REPEATNZ=RND(10)-1:n$=
n$(NZ+1,0X)
2210 UNTILn$(>n$(bwn$(bn$,
0X),0X)
2220 ENDPROC
2230 DEFPROChowzat
2240 RESTORE970
2250 FORS$=0TO10:READX$,Y$
2260 PRINTTAB(X$,Y$-1)CHR$1
254TAB(X$,Y$)CHR$255
2270 NEXT
2280 SOUND1,1,100,40
2290 ENDPROC
2300 DEFPROCbowled has(bt$-
1,T$)="b. "+n$(bwn$(bn$,0
X),0X):PRINTTAB(10,10)CHR$1
29:PRINTTAB(0,30)"HOWZAT! (
bowled "n$(bwn$(bn$,0X),0X)
")'"Press any key...";:PRO
Chowzat:A=GET:out$=-1:ENDPR
OC
2310 DEFPROCresults:CLS
2320 PRINTTAB(10,10)"RESUL
TS"
2330 PRINTTAB(5,15)n$(0,0)
:TAB(20);tot$(0);FNwk(wk$(0
))
2340 PRINTTAB(5,20)n$(0,1)
:TAB(20);tot$(1);FNwk(wk$(1
))
2350 IFtot$(0)>tot$(1)PRIN
T"SPC(10)n$(0,0)" win by "
;tot$(0)-tot$(1);" runs."
2360 IFtot$(0)<tot$(1)PRIN
T"SPC(10)n$(0,1)" win by "
;10-wk$(1);" wickets."
2370 IFtot$(0)=tot$(1)PRIN
T"SPC(10)TAB(10)"match dra
wn."
2380 ENDPROC

```

2390 DEFPROC(W\$)IFNZ=10:=""
all out"ELSE:=" for "+STR\$(W\$)+" dec."
2400 DEFPROCadd2(a\$)IFX\$<0
ANDABS(Y\$)<200PRINTTAB(25,3
)+"extras":rn\$(0,T\$)=rn\$(0
,T\$)+a\$:ENDPROC
2410 rn\$(bt1\$,T\$)=rn\$(bt1
,T\$)+a\$
2420 IFa\$MOD2=1 A\$=bt1\$:bt
1\$=bt2\$:bt2\$=A\$
2430 tot\$(T\$)=tot\$(T\$)+a\$
2440 runs\$=runs\$+a\$:ENDPRO
C
2450 DEFPROCmissed
2460 A\$=RND(40)
2470 IFAX=1 PROC1bw:ENDPRO
C
2480 IFAX<4 PROCbowled:END
PROC
2490 IFAX<10 PROCdinky:END
PROC
2500 IFAX=10 PROCbighit:EN
DPROC
2510 PROCkeeper:ENDPROC
2520 DEFPROCtossup CLS
2530 OX=RND(-TIME)
2540 A\$=RND(2)
2550 PRINTTAB(5,6)n\$(0,A\$-
1)" wins the toss..."
2560 PRINTTAB(10,10)"Bat f
irst or second ?"
2570 PRINTTAB(15,14)"1/2"
2580 REPEATB\$=GET-40:UNTIL
A\$>0ANDA\$<3
2590 IFAX>80PROCswap
2600 ENDPROC
2610 DEFPROCswap
2620 FORT\$=0TO11:A\$=n\$(T\$,
0):n\$(T\$,0)=n\$(T\$,1):n\$(T\$,
1)=A\$:NEXT
2630 FORT\$=0TO10:AZ=bts\$(T
\$,0):bts\$(T\$,0)=bts\$(T\$,1):
bts\$(T\$,1)=AZ:NEXT
2640 FORT\$=0TO5:AZ=bws\$(T
\$,0):bws\$(T\$,0)=bws\$(T\$,1):b
ws\$(T\$,1)=AZ
2650 AZ=bwn\$(T\$,0):bwn\$(T
\$,0)=bwn\$(T\$,1):bwn\$(T\$,1)=A
\$:NEXT
2660 ENDPROC
2670 DEFPROCrunning
2680 PRINTTAB(0,31)\* Run
(Y/N) ?";
2690 S\$=0:G\$=0
2700 REPEATA\$=GET\$:UNTILA\$=
"Y":A\$="N"
2710 PRINTTAB(0,31)SPC(20)
;



```

2720 IFAS="N" ENDPROC
2730 PROCfnear:X$=X$/32:Y$=
(1023-Y$)/32
2740 REPEATS$=5$+1
2750 PROCrun
2760 IF NOTout$ PRINTTAB(0
,31)" Run (Y/N) ?":REPEAT
A$=GET$:UNTILA$="Y":ORA$="N"
2770 PRINTTAB(0,31)SPC(20)
;
2780 UNTILout$ORA$="N"
2790 IFNOT out$ PROCadd2IS
$) ELSE PROChowzat:PRINTTAB
(10,31)"Run out";:A=GET:out
$=TRUE:ho$(bt1$-1,T$)="run
out"
2800 ENDPROC
2810 DEFPROCfnear
2820 RESTORE970
2830 NS$=1000:NZ=0
2840 FORM$=1TO11
2850 READA$,B$:IFABS(A$-X$-
/32)+ABS(B$-(1023-Y$)/32)<N
S$ NZ=ABS(A$-X$/32)+ABS(B$-
-(1023-Y$)/32):MX$=A$:MY$=B
$:NZ=NZ-1
2860 NEXT
2870 ENDPROC
2880 DEFPROCrun
2890 NZ=12:REPEAT
2900 IF B$ PROCthrow ELSE
PROCmove
2910 PRINTTAB(MX$,MY$-1)CH
R$130TAB(MX$,MY$)CHR$131
2920 PROCmem
2930 UNTILout$ OR NZ=28
2940 ENDPROC
2950 DEFPROCmove
2960 PRINTTAB(MX$,MY$)" "T
AB(MX$,MY$-1)" "TAB(10,10)C

```

*This listing is included in this month's cassette tape offer. See order form on Page 53.*

IF you own Acornsoft's excellent word processor View, but have been disappointed to find that it does not allow you to use different print styles within a document, then this routine is for you.

The manual says a printer driver is needed to allow underlined or bold text. Such a driver is available for Acornsoft on cassette for around £10. It contains a collection of routines for different printers.

The program presented here sets up a printer driver for use with any Epson-compatible printer.

It allows eight different print styles – underlined, bold, italics, double strike, NLQ, condensed, elite, enlarged or just about any combination of these.

The driver also provides a pad character, or absolute space facility.

View sets aside one page of memory, &400 to &4FF, for a printer driver. Unfortunately the routine must be written in machine code, and very efficiently too, to cram as much useful code as possible into the 256 bytes available.

Program 1 sets up the required machine code routine and saves it to tape or disc.

It is essential that the program is entered very carefully as typing errors in assembly language are extremely difficult to spot and any mistake will only become evident when View refuses to print out your document correctly.

The driver code is saved under the name GLP since this is the name of my printer – a Centronics GLP. It would be wise to save the program itself as well, under a different filename such as Driver.

After entering View type:

PRINTER GLP

or whatever you've called the driver, and press Return. The driver should load, and if all has gone well PRINTER GLP should appear on the screen underneath Screen Mode 6.

Now type in or load a piece of text. The default highlights, underlining and bold printing can be selected by pressing

# Ring the typographical changes

**IAN BROWN shows how to do it with his View Printer Driver**

Func+H or Func+J before and after the text to be highlighted.

You'll see an inverse dash or asterisk printed on screen. However to select other print styles the HT stored command must be used.

Each of the eight print styles provided by the printer driver has a code, as shown in Table I. You will see that the codes 128 and 129 correspond to the two default highlights.

To select Italics in place of underlining for instance, you would need to set one of the highlights to produce code 130.

Press Func+O to enter a stored command in the margin and enter HT followed by Return and type 1 130. You've now altered highlight 1, Func+H to print text in italics.

The same can be done with highlight 2, Func+J. For instance, enlarged text can be selected in place of bold

printing by using HT 2 135. Func+J will then produce enlarged print.

Take a look at Figure 1 to see how it's done.

It may seem from this that only two separate print styles can be used at any time. However, remember that a highlight code selected on a previous line will not be cancelled unless actually switched off so it is in fact possible to have double strike, underlined, enlarged, condensed, bold, italic printing if your printer can cope with that combination!

The printer driver switches off the paper end detector to allow printing right up to the end of the page if cut sheets are used.

As mentioned earlier, the driver also provides a pad character facility. Whenever an absolute space is required, that is one which will not be affected by formatting, type £ instead of pressing the Spacebar.

Thus typing:

**ELECTRONEUSER**

will ensure that:

**ELECTRON USER**

is printed out with no extra formatting spaces, and not split over two lines.

In the actual printout the £ sign is replaced by a single space.

The £ character, CHR\$(96) was chosen as the pad

character because, on most printers, this code is printed as the largely useless ' sign. The printer driver simply intercepts this code and replaces it with CHR\$(32).

You can alter the pad character by changing the 96 in line 530 and if you want to print a £ use a hash instead which will print as a £ if the English character set has been selected.

The printer driver is loaded by View into page 4 of the Electron's memory. However the machine code cannot be assembled here because it is used by Basic to store the integer variables A% to Z%.

Therefore the code must be assembled elsewhere, but as if it was at &400 using OPT 4 and 6. This directs the assembler to assemble the code as if it was at P% but to store it at 0%.

View expects a jump table to be between &400 to &40E. The first JMP instruction, at &400, is called when a character is to be printed.

The second and third JMPs are executed to switch the printer on and off respectively.

The final two JMP instructions are associated with microspacing, but since most printers do not support proportional spacing there seemed little need for the driver to support this facility, and so

Code	Highlight
128	Underline
129	Bold
130	Italics
131	Double strike
132	NLQ
133	Condensed
134	Elite
135	Enlarged

Table I: Highlight codes

*From Page 21*

they just point to an RTS command.

The subroutine *prn* starting at line 180 is called to switch the printer on. It checks the location labelled *Init* to see if this is the first time the routine has been called.

If it is, the printer is initialised by sending Esc @. Also the paper and detector is switched off. The codes for these two operations are held at location *intab* and can be altered if required.

The bulk of the program is concerned with printing and selecting highlight codes. The routine *char* is called with the code of the character to be printed in the accumulator.

Line 310 checks to see if the character code is less than 128: If it is the character is a normal printable one, and control is passed to *norm*.

This replaces any C with a space (the pad character facility) and sends the character to the screen and the printer.

If the character code lies

between 128 and 135 this signifies a highlight command. Codes greater than 135 are ignored.

128 is subtracted from the code to give a value between 0 and 7. Line 340 then multiplies this value by 8 to index into the printer control code table stored at line 770.

Each of the lines 770 to 840 contain four bytes, one line for each highlight. Esc code &1B is omitted since the routine assumes that all highlights are Escape code sequences.

It is necessary to have some means of knowing whether a highlight is currently on or off.

This information is con-

tained in a single byte, labelled *buffer* in line 710. Each of the 8 bits in this byte corresponds to one highlight: 1 for on and 0 for off.

All printers are different and yours may require different control codes to mine, so you'll need to change the codes contained lines 770 to 840.

For instance, suppose that your printer requires the sequence Esc A 0 to turn on italics and Esc A 1 to turn off italics.

First forget the Esc code, since all the highlights are considered to be Esc sequences, and convert the rest to hexadecimal Ascii codes.

So it's &41 plus either &30

to turn on italics or &31 to switch off italics.

In the control code table &FF means the next two bytes switch the effect on and off so the data would be &41,&FF,&30,&31.

In assembly language this translates to EQU D &3130FF41. Notice that the four bytes following EQU D are written in reverse order. You would replace line 790 with:

798 FOUND 53138EE41

That's about it. Remember to type the program in very carefully, and with a bit of practice you'll be producing professional documents with varied type styles.

10 REM View Printer	260 .proff	LDA #3:JSR os	490	JMP finish	730 .dbuf	EQUB 0
20 REM Driver	wrch		500 .ok	JSR send	740 .ybuf	EQUB 0
30 REM By Ian Brown	270	RTS	510	INX	750 .intab	EQUD \$381B401
40 REM (c) Electron User	280 .char	STA abuf	520	JMP loop	8	
50 :	290	STX xbuf	530 .nora	CMP #96:BNE n	760 .table	\printer code
60 oswrch=\$FFEE	300	STY ybuf	540	LDA #32	9	
70 osascii=\$FFE3	310	CMP #128:BMI	550 .notpad	JSR osascii	8	
80 DIM Q1 \$100	norm		560 .finish	LDA abuf	730 EQUD \$0001FF20 \HT 12	
90 FOR I=4 TO 6 STEP 2	320	CMP #136:BPL	570	LDX xbuf	9	
100 PI=\$400	finish		580	LDY ybuf	790 EQUD \$003534FF \HT 13	
110 D%=\$1	330	SEC:SBC #128	590	RTS	8	
120 CPRT I	340	ASL A:ASL A	600 .send	PHA	920 EQUD \$004847FF \HT 13	
130 .print	JMP char	350	TAX	610	LDA #1:JSR os	1
140 .on	JMP pron	360	LDA #2:JSR s	wrch	810 EQUD \$00004645FF \HT	
150 .off	JMP proff	end		620	PLA:JSR oswrc	132
160 .micro	JMP ret	370 .loop	LDA table,I	h	630	820 EQUD \$00120FFF \HT 13
170 .option	JMP ret	380	SPL ok		640 .flag	830 EQUD \$005040FF \HT 13
180 .pron	LDA #2:JSR os	390	INX		650	BIT buffer:BE
wrch		400	LDA abuf:SEC:	0 over	660	840 EQUD \$0001FF57 \HT 13
190	LDA init:BNE	SBC #128	410	TAY:LDA #1	670	INY
ret			420 .yloop	DEY:BMI out	680	850 )
200	LDX #0		430	ASL A	690 .over	EOR buffer:ST
210 .xloop	LDA intab,I:J		440	JMP yloop	A buffer	860 NEXT
SR send			450 .out	JSR flag:BEQ	680	870 FOR bI=0I TO (Q1+\$FF)
220	INX		460	INI	690	;
230	CPX #4:BNE xl	switch	470 .switch	LDA table,I	700 .init	EQUB 0
oop			480	JSR send	710 .buffer	EQUB 0
240	INC init		490		720 .abuf	+\$01* +100*
250 .ret	RTS					000 OSCLI "SAVE GLP "+STR\$



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## Help for the Boat People

MICROLINK is being used to bring hope to thousands of distressed Vietnam refugees living in the UK.

Their plight largely ignored, these former Boat People have become a forgotten multitude of have-nots crowded into standard dwellings.

Their families are dispersed and they are unable to find work or obtain help from social agencies because of language difficulties and their ignorance of "the system".

But now MicroLink's telex and electronic mail services are easing cases of hardship by speeding the reunification of families and smoothing their path into Western society.

Many former Boat People are suffering because when they arrived in Britain the

authorities assumed that being Vietnam refugees they were automatically Vietnamese.

In fact three-quarters of them were ethnically Chinese, speaking only a form of Cantonese and unable to understand the Vietnamese instructors hired to teach them English.

As a result they were classed as incapable and illiterate and many suffered severe psychological problems as a result of their failure to adapt to British society.

Because of their inability to communicate they could not even obtain adequate help from social agencies and hundreds ended up in squats and dingy hostels.

Shunned by the ethnic Vietnamese, and even UK Chinese communities,

because they were considered inferior, the former Boat People faced a bleak future.

But a Chinese Vietnamese Advice Centre staffed by voluntary social workers has been opened in London to help them, and it is using MicroLink in its efforts.

Alf Jackson, one of the volunteers, said: "MicroLink's facilities will enable us to establish better communications with refugee agencies all over the world – particularly Hong Kong – and put dispersed families in touch.

"As well as the reunification of families, our work is concerned with improved housing for the refugees and their integration into UK society, for instance helping them set up in business".

## CLIFF IS STILL TOPS

*DESPITE what some critics might say the top show in London is the Cliff Richard musical Time.*

*At least that's the verdict of MicroLink subscribers according to the volume of bookings placed through TheatreLink, which is operated in association with renowned theatrical agency Edwards & Edwards.*

*Although Time has been panned by some of the critics it beats the long-running hit musical Cats into second place in the MicroLink theatre-goers' Top Ten.*

*In third place comes Me And My Girl – another of the eight musicals in the popularity list – followed by 42nd Street, with Starlight Express in fifth place.*

*Another target for the critics, Mutiny!, comes sixth followed by perennial favourite thriller The Mousetrap and the comedy hit Run For Your Wife.*

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## Commonwealth link?

MICROLINK has been chosen as a potential medium of communication between the Commonwealth Secretariat in London and the organisation's 49 member countries.

A project is underway to assess various electronic mail and telex options in conjunction with the Secretariat's planned expansion of its computer facilities.

The aim is to improve the speed and efficiency of links between member countries and also with international

bodies like the United Nations' agencies and the World Bank.

The Commonwealth's own specialist databases will also be set up as part of the project which is expected to be completed in about two years time.

"MicroLink is one of two systems we are experimenting with at the present time", said Commonwealth Secretariat computer manager Peter Windle. "We have been impressed by its user-friendliness and ease of use".

# DMP 2000

**Just the ticket for  
your Electron, and  
the price is right**



**Product:** Amstrad DMP2000  
**Price:** £159.95  
**Supplier:** Amstrad, 169 Kings Road, Brentwood, Essex CM14 4EF. Tel: 0277 230222

**THE Amstrad DMP2000 is a neat front-loading printer in matt black plastic, with a removable smoked plastic cover.**

On the right hand side of the sloping fascia is a column of three buttons, On Line, Form Feed and Line Feed.

There are also three indicator lights, for On Line, Paper Out and Power On.

When the printer is switched on there is a brief pause while the printer head sets itself up, then the On Line light comes on indicating that it is ready to receive from the computer.

Other controls include a paper depth indicator and the Friction/Tractor feed switch.

The accompanying manual is very clear on setting-up

**By DAVE BERTENSHAW**

procedures, and I met no difficulty in preparing it for use.

The ribbon is easy to fit and you don't get your hands covered in ink doing it, either.

Replacement ribbons appear easily obtainable and cost £5.70.

Paper is easy to load. It is fed in from the front and kept flat, an arrangement I like, especially with sheet paper.

To connect it up to the Electron you will need both an interface such as the Plus One, and a Centronics lead as well as the one supplied with the printer does not fit the Plus One.

After a problem-free assembly came the big moment, my first words in print.

This was surprisingly easy after all the horror stories you hear about printer manuals written in Japanese English for

obscure Basics.

The DMP2000 was designed for use with non-Amstrad computers, and each instruction is repeated four times, in Amstrad, Commodore, Microsoft and (most important of all) BBC Basic.

Also the English is the sort the Queen would recognise.

A simple matter of VDU2 to send information to the printer, PRINT "HELLO", and there it was, in black and white, my first masterpiece.

The DMP2000 comes equipped with six typefaces: Standard (or Pica), Mini (or Elite), proportional, condensed, near letter quality (NLQ) and NLQ proportional.

To these can be added a variety of options - double-strike, subscript, superscript, bold and italic, although not every option can be used with every typeface. For instance,

NLQ cannot be used with italic.

However, every option can be used with doublewidth and/or underline.

Choosing the typeface option is done via control codes and is, as far as I can tell, completely Epson-compatible (which means that the printer can be used with a variety of commercial software using the Epson standard).

So to choose the doublewidth option you would use VDU2,1,27,1,ASCII("W"),1,1.

This may look complicated but you soon get the hang of it, and the manual gives plenty of help.

My wife teaches French and German, so one feature we have found very useful is the ability to use foreign character sets.

This can be done either by using the control codes or by altering the DIP switches. These tiny switches are recessed into the back of the printer and can be set to choose the power-up state of the printer.

They can be used to select various functions so that you don't have to be constantly using the control codes.

By setting these switches - again clearly explained in the manual - then switching on the printer, you can change the character set to one of nine. This means that you can print French with acute accents, German with umlauts and so on.

The drawback is that these new letters occupy ASCII codes

**This is STANDARD typeface, which can be made bold or italic or even bold italic doublewidth underlined subscript and superscript.**

**What about condensed italics, or doublestrike?**

**You can have MINI or PROPORTIONAL**

**and, for those important letters Near-Letter-Quality (NLQ)  
or, to crown it all, NLQ PROPORTIONAL!**

*There are more than 100 different print options*

*Mon père, mon postillon a été frappé par un éclair à Alençon.*

*Das schöne Fräulein ißt viele Käse in der Küche.*

*And the script can be French or German or...*

### From Page 27

normally used by other symbols, such as the curly bracket. You therefore have to get used to typing words like trjs, but this is easily learnt.

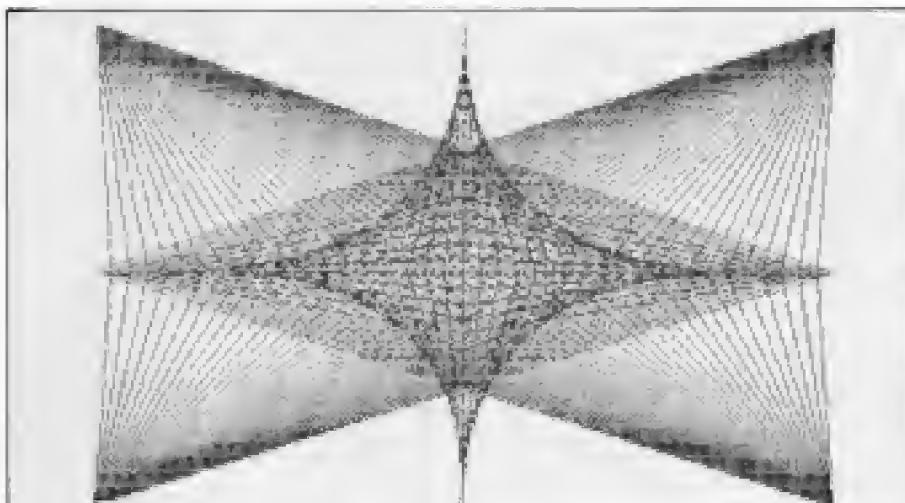
Obviously, the difficulty is only apparent on the screen — the printer spews out perfect French.

One anomaly is that there is no symbol for the circumflex accent. This could prove to be a nuisance.

Only you can decide whether a circumflex accent is worth the extra cost of buying a printer with the full international character set.

There are various graphics options, including single, double and quadruple density modes.

Needing a screen dump I called upon my vast reserves of programming experience. That is I looked through my back issues of *Electron User* until I found Roland Wad-dilove's article "What a



A Mode 1 screen dump

dump!" (March 1985).

The machine code version of this works perfectly without alteration.

I have only two slight moans about the DMP2000. The first is that there is no tear-off arrangement for tractor paper, which is annoying.

The second is not really Amstrad's fault at all. I use View as my word processor and the big flaw in that, as reviewers have pointed out, is

that none of the printer's effects is available unless you buy the View Printer Driver.

The version I have seems to be out of date, because while it works well with underline, bold, doublewidth and sub/superscript, there is no way of accessing the other facilities from within View. Fortunately the driver listed in this month's issue can cope.

You can set NLQ, condensed and bold using the DIP

switches, but this is unnecessarily complicated.

The DMP2000 has many more features than can be included in this review. Suffice it to say that through the control codes you have access to a wide range of options as to page length, vertical and horizontal TAB settings and paper feed rates and direction.

As you have probably guessed by now, I am very impressed with the DMP2000. The print quality is very good (NLQ is excellent), the workmanship of the printer is without fault and above all the price is very interesting indeed.

All these qualities set me back under £160, at least £60 less than the Epson LX80 reviewed in the February 1986 issue of *Electron User* and I didn't pay extra for the tractor feed.

All things considered, Amstrad are to be congratulated on producing the right features at the right price.

# ADVENTUROUS PEOPLE LOVE ROBICO



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*"We turn dreams into reality!"*

**MYTHS** abound in the world of computers and education. Many parents helped to fuel the computer boom a year or two ago acting on the belief that any teenager who sat at a computer became a programmer.

The sky was the limit for these people. At the very least, a good job was a certainty and large numbers of youngsters could earn £50,000 a year by the time they were 16.

In fact, of course, the number of highly paid whiz kids was very limited and, sadly, unemployment has continued to rise.

Even so, all sorts of parents still felt that the ability to use, and in particular program, a home micro is a passport to a successful career.

The baffling thing for such parents was that schools did not seem to have got the message.

In secondary schools programming, if taught at all, was reserved for a small number of 15 and 16-year-old boys. For the younger boys and all girls, computers were mere tools using pre-written programs.

If so many parents thought and still think that programming skills are important, why is it that schools ignore them?

There are a number of reasons, but perhaps most important is that there are many different languages.

Basic (Beginners All Purpose Symbolic Instruction Code), is just one language, and in terms of the real world it is of minor importance.

Even Basic appears in dozens of different versions. These are usually called dialects and different computer designers seem to have their pet versions.

Schools can't really cope with the problem of different languages and dialects.

For instance, the Electron and Spectrum have different dialects and a program written in Basic for one machine has only a limited chance of running on the other.

So a school working in Electron (BBC) Basic would give only limited value to Spectrum owners, and no value at all to industry and commerce.

In practice suitable people can be trained quickly in a particular language, which

# Overcome language barriers

might be Fortran, Cobol, Pascal and so on as and when needed.

Despite this many teachers and educationalists think that programming has value and may do some teaching of the required processes as a club activity. All sorts of skills can be enhanced by getting to grips with the micro.

One of the present fashions in education is problem solving. Put crudely, a teacher might give the pupils a task such as making a bridge out of straws. The materials available would be specified and pupils will attempt the task and learn from successes and failures.

Programming a computer can be a problem solving exercise. The task could range from writing your name all over the screen to producing an arcade adventure of the quality of Citadel. No matter

what the problem, solving it can be a valuable learning activity.

One of the skills gained is the ability to use the computer language, but perhaps more important is the ability to specify and analyse a situation, consider various solutions and select the best.

It's not all that different from coping with life, is it?

One of the main reasons that people choose the Electron is because it has a good version of Basic and is fairly easy to program.

(The adverts always stress that by getting an Electron you're getting the same version of Basic that most school computers use.)

Most children find programming hard though, even on the amazing Electron.

The chief difficulty that would-be young programmers

encounter is "What should I program?" Often they do not have a problem they wish to solve. Sometimes tied up with this is the thought that "Any program I write will be boring".

Almost as an afterthought comes the second area of concern. This applies to virtually any piece of complex equipment, be it computer, printer or household appliance – the instructions in the user guide are incomprehensible.

A helpful adult can earn his or her keep in overcoming the first problem.

Such an adult needs to be able to create an unlimited supply of challenges to be solved and dole out encouragement, congratulations and constructive criticisms.

Let's look first at creating programming tasks. There's no point trying to get a child to program at home if the idea does not appeal.

The majority of youngsters are happy to generate graphic displays. Most people seem to think that graphics are difficult, but in fact it's easy to draw using BBC Basic.

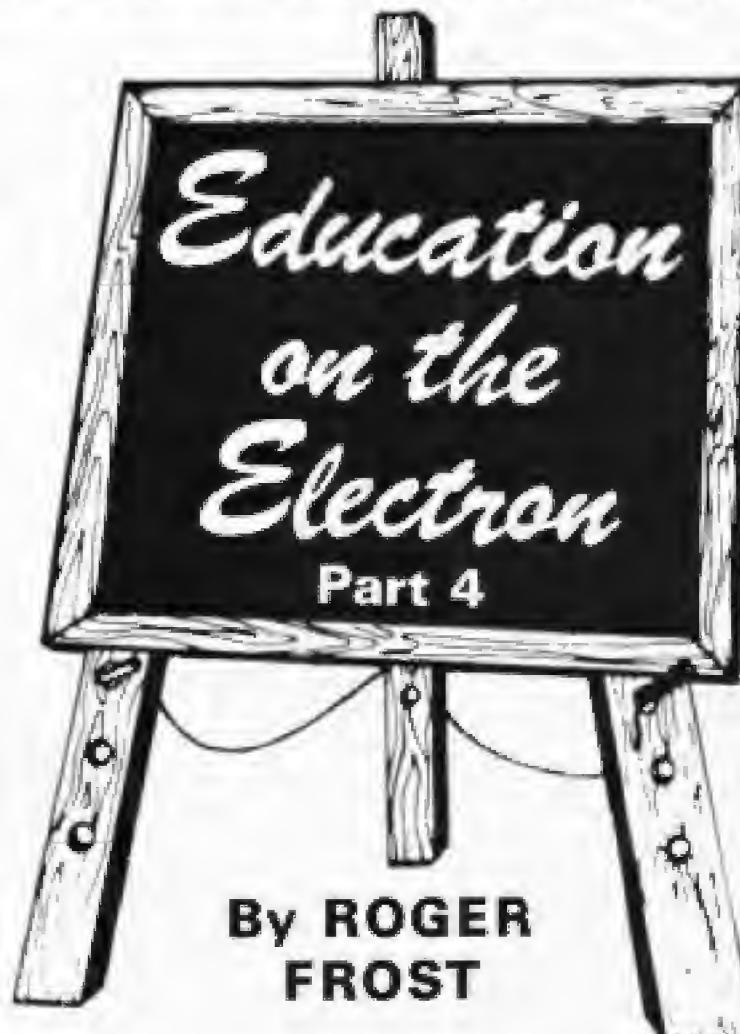
Children at school learn about graph paper and coordinates from very early ages. The two keywords MOVE and DRAW, along with the idea that the screen is a grid, can get youngsters started.

A task such as drawing your own house will not prove beyond most secondary children and it will soon have them seeking for more information such as "How do I change colours?" or "Can I fill in whole areas".

It's possible that some children will realise that drawing four identical windows, all with separate code, is absurd. Such a child now has the need for subroutines or procedures within programs.

So from a simple idea a youngster can develop in his or her own way and can also learn that the first idea he or she thought of is not necessarily the best solution.

A difficulty about graphic programming is that some younger children can't cope with the large numbers. The screen grid of 1280 by 1024 has over a million locations to



## From Page 29

keep track of.

I have found that a scaled screen can make life a lot easier. Addcomm, from Vine Micros, has a scale command which allows you to redefine the screen grid in any way you care to.

A 10 by 10 grid is simple enough for juniors and some infants though it wouldn't satisfy the more meticulous, older child who wants accuracy.

Another way of helping younger children is to write a set of graphic procedures — circle, square, triangle and so on — which can be called up easily. You do the main coding, leaving the child to solve the problems.

When it comes to encouragement and criticism, don't expect your child to produce perfection. Try to encourage them to improve screen layouts.

You don't need to be a programmer yourself to offer

artistic advice. For instance, programs with text in should not have a word split between two lines. Gently persuade youngsters that they can get it right and they will.

The second area of concern for the programmer is the quality of the user guide. There is no escaping that learning Basic can be a bit of a graft.

The problem solving approach to programming means that new ideas and keywords are discovered only when they are required.

There seems very little point in ploughing through a book and learning about keywords that are virtually never used.

The Basic word ATN is a good example. No doubt it has some uses, but the vast majority of learner programmers will just be confused by the user guide's nearly incomprehensible definition.

What is really needed is an easy-to-read, well organised and coherent book of Basic. For the under elevens, I would

suggest something from the Usborne range.

These books are cheap and cheerful and make a real attempt to make a complex subject simple. Each book may have a specific purpose, such as writing adventure programs or logic games.

They are not Electron books though, being written to cover some of the lesser computers as well.

This means that some of the demonstration programs do not make the best use of the Electron's facilities.

At the next level, a very readable guide is Getting Started in BBC Basic by Mike Bibby, available from Database Publications.

This tutorial-style book starts at the very beginning and could lead an enthusiastic teenager up to a good standard of programming.

An extremely good method of discovering how to code Basic is to look at the listings of programs which do something similar to what is required.

This can point a youngster to particular keywords which might be useful and further research can be done on those words.

Learning Basic then, is not essential for life in the 1980s, but as a problem solving exercise it can have numerous benefits.

It may not actually help children with school work, but hopefully they will learn that with a bit of effort in planning and research difficulties can be overcome.

Almost as an afterthought comes the fact that programming can be immense fun and very satisfying.

One final comment. Programming is actually alive and flourishing in primary schools. Basic is not used, because for all manner of reasons Logo is preferred.

We'll look at Logo on another occasion, but next month will feature an educational use for spreadsheets that could also save you some money too.

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- ★ 2 from 9 substitutes (the FA tells us so).

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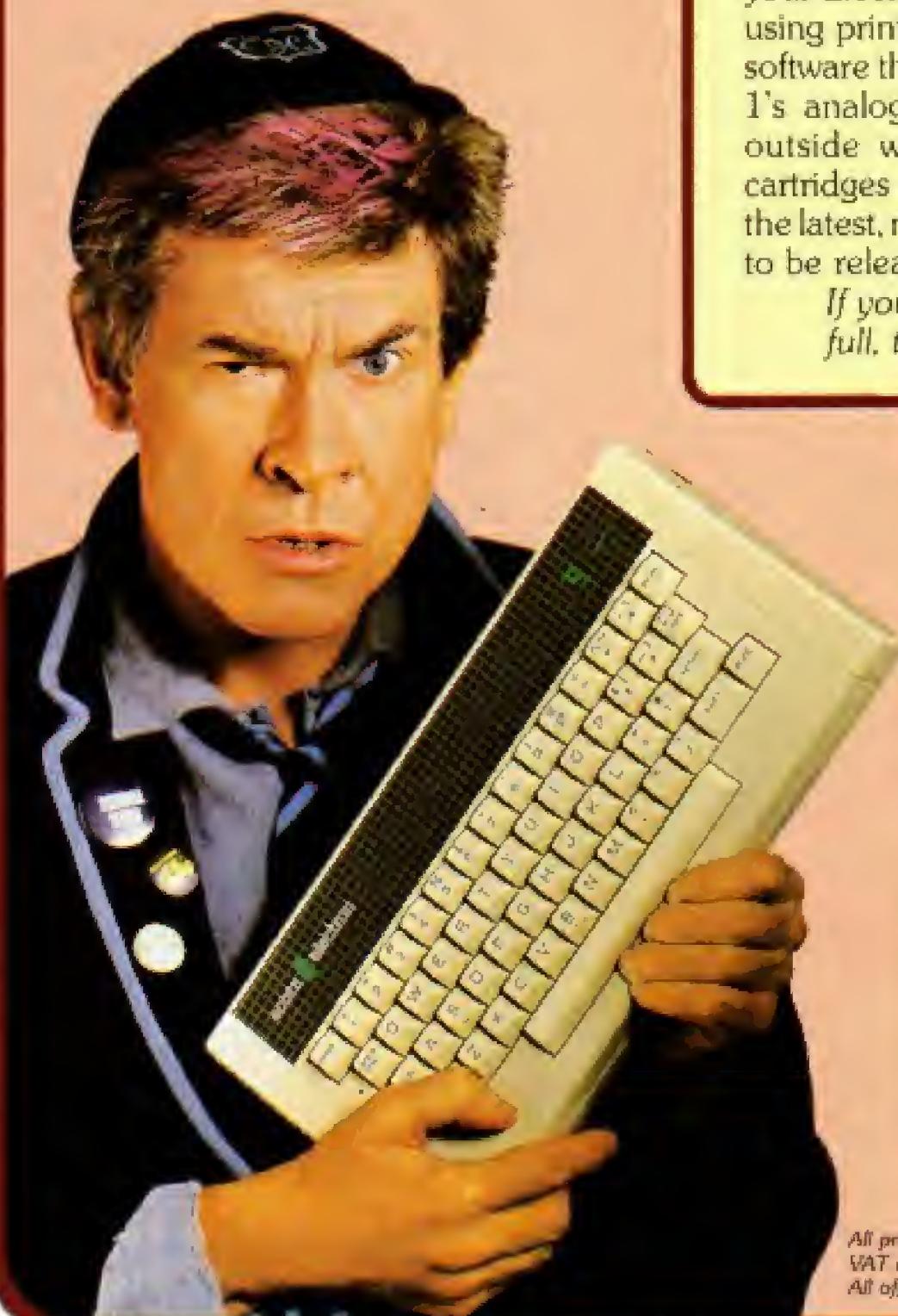
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on Page 53

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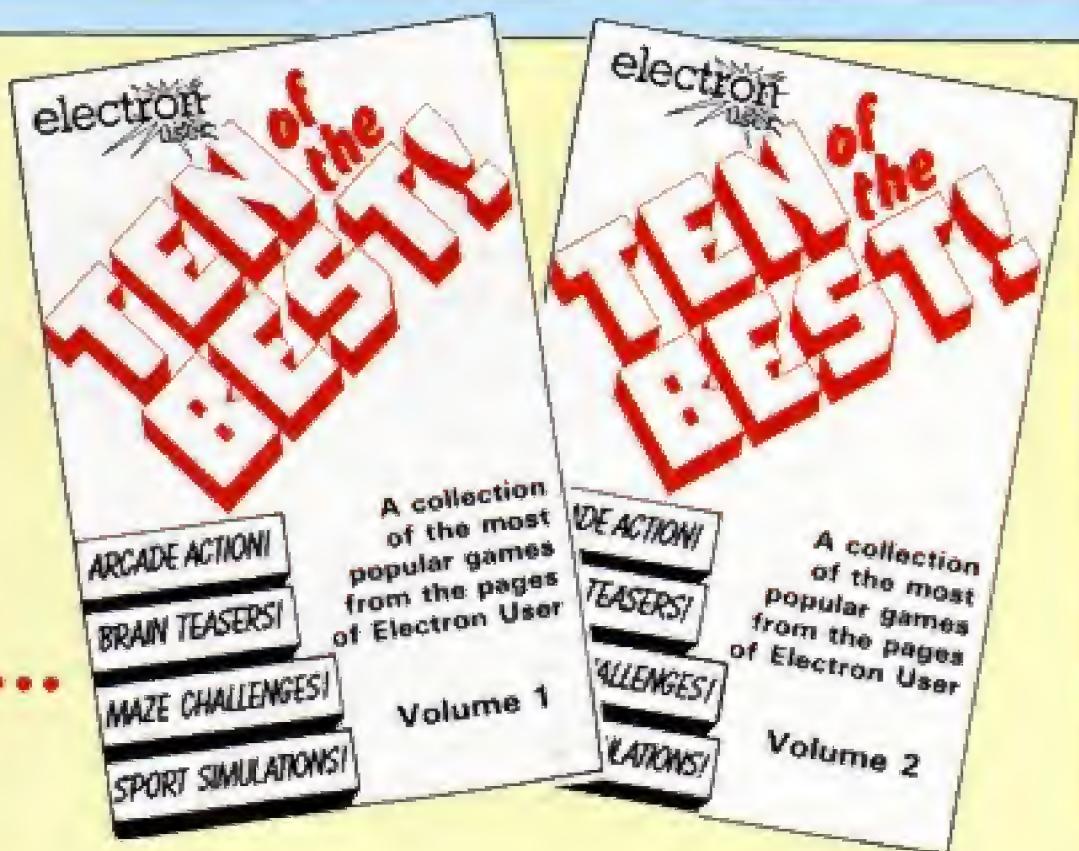
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TO ORDER, PLEASE USE THE FORM ON PAGE 53

**TEXTED** is a simple text editor which will enable you to write short letters, documents and articles on your Electron and print them out using a suitable printer.

It's simple, easy to use and ideal for quick notes.

Although not a full blown word processor, it does have some useful features and you should find it adequate for fairly straightforward tasks.

There's about 11k of memory free and all text is printed out with word wrap. (Word wrap means that it won't split a word over two lines, it takes it down to the start of the next).

When you run TextEd, after a short pause you'll see a menu with a list of nine options to choose from.

The first option is to enter edit mode to input text. The editor is always in overwrite mode, so whatever you type in overwrites any text already on the screen.

This is not a WYSIWYG (What You See Is What You Get) type of word processor. The screen may look very untidy at times but the print routine sorts everything out, adding tabs, carriage returns and word wrap.

This isn't unusual by any means — Mini Office does the same — and you'll soon get used to it.

The cursor can be moved anywhere on the screen using the cursor keys and then text is entered. When the cursor hits the bottom of the screen using cursor down, the screen will scroll up so you can enter more text.

You can get back to the start of the text by holding down cursor up. When the cursor hits the top the screen will scroll down.

The line number of the bit of text at the top of the screen is printed in the top left corner so you can see where you are in the document or letter.

The Return key takes the

Line: 000 Esc=Menu  
TextEd is a simple text editor which will enable you to write short letters, documents and articles on your Electron and print them out using a suitable printer. It's simple, easy to use and ideal for quick notes. It's not a full blown word processor but it does have some useful features and you should find it adequate for fairly straightforward tasks. There's about 11k of memory free and all text is printed out with word wrap. (Word wrap means that it won't split a word over two lines, it takes it down to the start of the next). When you run TextEd, after a short pause you'll see a menu with a list of nine options. I'll go through these ■

F1=Edit F2=Print F3=Insert F4=Remove

# TextEd

**ROLAND WADDILOVE offers a useful text editor that will convert your computer into a versatile electronic typewriter**

cursor to the start of the next line and Delete backspaces and deletes as normal.

To start a new line or paragraph you enter a carriage return by pressing function 0 — it looks like a bent arrow on screen.

Note that this does not start a new line on the screen, it only comes into effect when you print the text. There's no need to move to the start of a new line on the screen.

Carry on typing straight after the carriage return.

Function 1 enters a Tab character which is equivalent to inserting five spaces. It looks like a right arrow on screen and is useful at the start of new paragraphs.

If you forget something and want to insert a word in the middle of the text press function 2. This inserts spaces at the cursor position shuffling

text along which you can then overwrite as normal.

To remove text without inserting spaces press function 3.

To return to the main menu from edit mode press Escape.

Option 2 is to print the text. Always set up the printer before running TextEd as you can't alter the style halfway through a document. You can set NLQ mode or double space or whatever you want, then load and run TextEd.

First you'll be asked for the line length. This is how wide the text is when printed.

Next, input the width of the left margin. It's up to you to make sure that the printer can cope with the figures.

Entering a line length of 80 and margin of 10 when the printer can only print 60 columns will not produce neatly formatted text. Press

any key to abort printing.

Option 3 is to load a text file. Remember that any text currently in the memory will be lost. If you don't enter a filename TextEd assumes that you don't want to load anything, so it won't erase the old text. It's an escape route in case you select this option by mistake.

Option 4 is to save the text, and option 5 clears all the text so you can start afresh.

Options 6 and 7 allow you to select tape or disc to load or save a file. If you haven't got discs nothing will happen.

Option 8 will catalog the tape or disc depending which has been selected. If it's tape you'll need to press Escape when you've finished.

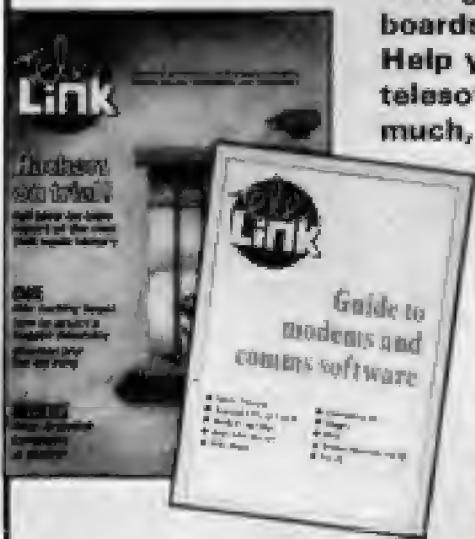
Option 9 exits from TextEd and returns you to Basic. Your

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## From Page 35

text is still in the memory, stored above HIMEM though, so if you're in the middle of a document and want to know what 27 x 56 is you can leave TextEd, type in the calculation, enter RUN and carry on where you left off.

A word of caution – anything which alters HIMEM will destroy the text.

TextEd is written almost entirely in machine code, so be careful when entering it. Unless you're an experienced Electron user I would suggest getting the monthly tape, as finding typing errors in an assembly listing isn't easy.

If you do decide to have a go at typing it in save it before running as it deletes all the assembly listing, leaving just a few lines of Basic.

It should be quite easy to add extra features such as merge two files, search and replace, or even a spelling checker. I'll leave that up to you though.

\*\*\*\*\* TEXTED \*\*\*\*\*

1. Edit the text.
2. Print the text.
3. Load new text file.
4. Save current text.
5. Clear all text.
6. Select tape filing system.
7. Select disc filing system.
8. Catalog disc/tape.
9. Exit from TextEd.

Press a key

TextEd is a simple text editor which will enable you to write short letters, documents and articles on your Electron and print them out using a suitable printer. It's simple, easy to use and ideal for quick notes.

It's not a full blown word processor but it does have some useful features and you should find it adequate for fairly straight forward tasks. There's about 11K of memory free and all text is printed out with word wrap. (Word wrap means that it won't split a word over two lines, it takes it down to the start of the next).

When you run TextEd, after a short pause you'll see a menu with a list of nine options. I'll go through these

Sample printout using TextEd

## Texted listing

```

10REM **** TextEd ****
20REM By R.A.Waddilove
30REM (c) Electron User
40REM ****
50REM *If you renumber*
60REM *this program it*
70REM * won't work! *
80REM ****
90MODE 6:HIMEM=45800
100PROCassembly:END
110ON ERROR RUN
120PROCinitialise
130REPEAT
140PROCmenu
150IF K1=1 PROCedit
160IF K2=2 PROCprint
170IF K2=3 PROCload
180IF K2=4 PROCsave
190IF K2=5 PROCclear
200IF K2=6 THEN *TAPE
210IF K2=7 AND PAGE=41000
THEN *ADS
220IF K2=7 AND PAGE<41000
THEN *DISC
230IF K2=8 THEN OSCLI*FI2
240UNTIL K2=9
250CLS
260END

270
280DEF PROCprint
290PRINT TAB(10,5)*++ PR
300TEXT ***"TAB(10,10)"Lin
e length ":";INPUT LX:LY=ABS
(LX)MOD128
310PRINT TAB(10,10)SPC(40
)TAB(10,10)"Margin ":";INPUT
M2:M2=ABS(M2)MOD50
320PRINT TAB(10,10)SPC(40
)TAB(10,10)"Please wait";
330I=45FFF:JI=text+40:RE
PEAT II=II-4:UNTIL !I!(>A20
202020 OR II<JI:II=II+4
340PRINT TAB(10,10)"Press a key"
350I=JI=text:a$=""":VDU12,2
360REPEAT
370PRINT SPC(M1);
380REPEAT
390IF ?JI=128 a$=a$+CHR$1
3
400IF ?JI=129 a$=a$+
*410IF ?JI<127 a$=a$+CHR$?
JI
420JI=JI+1
430UNTIL LEN a$>LX
440AIX=LX
450IF MID$(a$,A1,1)>" "
AND A1>2 A1=A1-1:GOTO 450
460IF INSTR(a$,CHR$13) PR
INT LEFT$(a$,INSTR(a$,CHR$1
3)-1):a$=MID$(a$,INSTR(a$,C
HR$13)+1) ELSE PRINT LEFT$(a
$,A1):a$=MID$(a$,A1+1)
470UNTIL JI>JI OR INKEY$#
()**
480VDU 3
490PRINT **"Press a key";t
*FI2
500a$=GET$
510ENDPROC
520
530DEF PROCclear
540PRINTTAB(5,5)"Are you
sure you want to"TAB(9,7)"c
lear the text?";*FI2
550IF INSTR(" Yy",GET$)>1
CALL CI!:ptr=text:?x=0:?y=
1:?line=0;!top_line=text
560ENDPROC
570
580DEF PROCsave
590PRINTTAB(10,5)*++ SAV
E TEXT ***"TAB(10,10)"Think
ing"
600I=45FFF:JI=text+40:RE
PEAT II=II-4:UNTIL !I!(>A20
202020 OR II<JI:II=II+4
610PRINT TAB(10,10)SPC(15
)TAB(10,10)"Name ":";INPUT n
ame$:name$=LEFT$(name$,10)
620IF name$="" ENDPROC
630*FX229
640OSCLI"SAVE "+name$+" "
+STR$"text+" "+STR$"JI
650ENDPROC
660
670DEF PROCload
680PRINTTAB(10,5)*++ LOA
D TEXT ***"TAB(10,10)"Name
":";INPUT name$:name$=LEFT$(n
ame$,10)
690IF name$="" ENDPROC EL
SE CALL CI!:ptr=text:?x=0:?y=
1:?line=0;!top_line=text
700*FX229
710OSCLI"LOAD "+name$+" "
+STR$"text"
720ENDPROC
730
740DEF PROCmenu
750*FX229,1

```

## Texted listing

### From Page 37

```

760VDU26,12:PRINTTAB(5,1)
***** T E X T E D *****
770RESTORE780:FOR IZ=1 TO
9:READ a$:PRINTTAB(5,2+IZ+
2);IZ;". "a$."NEXT
780DATA Edit the text,Pri-
nt the text,Load new text f-
ile,Save current text,Clear
all text,Select tape filin-
g system,Select disc filing
system,Catalog disc/tape,E-
xit from TextEd
790PRINT TAB(10,23)"Press
a key";:VDU 23,1,1;0;0;0;:
*FX21
800REPEAT KI=GET-48:UNTIL
KI>0 AND KI<10:CLS
810ENDPROC
820
830DEF PROCedit
840VDU 23,1,0;0;0;0;
850COLOUR129:COLOUR0:PRIN-
TSPC(48)TAB(1,24)* f0=CR f-
1=TAB f2=insert f3=remov-
e *:COLOUR128:COLOUR1:PRIN-
TTAB(1,0)*Line*:TAB(31,0)*E-
sc=Menu"
860CALL TI
870ENDPROC
880
890DEF PROCinitialise
900VDU15
910a$=STRING$(255," ")
920*FX225,128
930IF FX=&12345678 FI=0:F
DRIX=0 TO &400STEP4:I:I&300
0=IX&5800:NEXT:CALL CX:REM
Move code+clear text
940ptr=&70:x=&72:y=&73:li-
ne=&74:top_line=&75:text=&3
401
950:ptr=text?x=0?y=1?li-
ne=0!:top_line=text
960ENDPROC
970
980DEF PROCsassamble
990FX=0:+KEYB DEL,30,1001
MDEL,970,5000:MH.=&3000:MRU
NIN
1000*FX16
1010*FX4,1
1020VDU 19,0,4;0;0;20,10,2
,39,0
1030PRINT *** TextEd ***
***Assembling code*
1040VDU 23,128,6,6,38,70,2
54,252,64,32:REM CR

```

```

1050VDU 23,129,8,12,6,254,
254,6,12,8:REM TAB
1100osrdch=&210 AND &FFFF
oswrch=&20E AND &FFFF:osb
yte=&20A AND &FFFF
1110text=&3481;text_end=65
FFF:maxline=255
1120ptr=&70:x=&72:y=&73:li-
ne=&74:top_line=&75:counter
=&77
1130temp=&78
1140FOR pass=4 TO 4 STEP 2
1150PX=&3000:OI=HIMEM
1160 OPT pass
1170.TI \texted
1180JSR window:LDA #12:JSR
oswrch:LDA #26:JSR oswrch
\CLS window
1190JSR line_number
1200JSR print_screen
1210\-----
1220.main_loop
1230LDA #!(main_loop-1)DIV2
56:PHA:LDA #!(main_loop-1)MO
0256:PHA \return address
1240JSR cursor_on
1250JSR osrdch
1260CMP #27:BNE a7:PLA:PLA
:LDA #126:JMP osbyte \Escap-
e
1270.a7 CMP #127:BNE a1:JM
P delete
1280.a1 CMP #136:BNE a3:JS
R cursor_off:JMP xleft
1290.a3 CMP #137:BNE a4:JS
R cursor_off:JMP xright
1300.a4 CMP #138:BNE a5:JM
P cursor_down
1310.a5 CMP #139:BNE a2:JM
P cursor_up
1320.a2 CMP #32:BCC a6:CMPI
#682:BCS a6:JMP valid_char
1330.a6 CMP #600:BNE a0:JM
P return
1340.a0 CMP #682:BNE a9:JM
P insert
1350.a9 CMP #683:BNE a10:J
MP remove
1360.a10 RTS \return to ma-
in_loop
1370\-----
1380.insert
1390LDY y:CPY #23:BNE in1
\bottom line?
1400LDX x:CPX #39:BEQ end_
insert \can't if at 39,23
1410.in1
1420JSR fx21
1430LDA #text_end MOD256:S
TA temp:LDA #text_end DIV25
6:STA temp+
1440LDY #0
1450.loop
1460SEC:LDA temp:SBC #1:ST
A temp:LDA temp+:SBC #0:ST
A temp+:temp+ \temp=temp-1
1470LDA (temp),Y:INY:STA (-
temp),Y:DEY
1480LDA temp:CMPI ptr:BNE 1
00p
1490LDA temp+:CMPI ptr+:B
NE loop
1500LDA #32:STA (ptr),Y \s-
insert space
1510JSR print_line
1520JSR inkey:BCC in1 \ke-
y held down?
1530.end_insert
1540JMP print_screen
1550\-----
1560.remove \remove space
s
1570LDY y:CPY #23:BNE reat
\bottom line?
1580LDX x:CPI #39:BEQ end_
remove \can't if at 39,23
1590.reat
1600JSR fx21
1610LDA ptr:STA temp:LDA p-
tr+:STA temp+: \temp=ptr
1620LDY #1
1630.loop
1640LDA (temp),Y:DEY:STA (-
temp),Y:INY \?temp=temp?!
1650CLC:LDA temp:ADC #1:ST
A temp:LDA temp+:ADC #0:ST
A temp+: \temp=temp+
1660LDA temp:CMPI #text_e-
nd DIV256:BNE loop
1670LDA temp+:CMPI #text_e-
nd DIV256:BNE loop
1680DEY:LDA #32:STA (temp)
,Y \space at end
1690JSR print_line
1700JSR inkey:BCC reat \k-
ey held down?
1710.end_remove
1720JMP print_screen
1730\-----
1740.print_line
1750LDA #31:JSR oswrch:LDA
x:JSR oswrch:LDA y:JSR osw-
rch \TAB(x,y)
1760LDA #40:SEC:SBC x:TAX
\number of chars to print
1770LDY #0
1780.loop
1790LDA (ptr),Y:JSR oswrch
1800INY:DEX:BNE loop
1810RTS
1820\-----
1830.return \go to start
of next line
1840JSR cursor_off
1850LDY y:CPY #23:BEQ end_
cr
1860.loop
1870JSR xright
1880LDX x:BNE loop \move
to start of next line
1890.end_cr
1900RTS
1910\-----
1920.valid_char
1930JSR oswrch \print cha-
r...also removes cursor
1940LDY #0:STA (ptr),Y \s-
tore char
1950JMP xright \x=x+1
1960\-----
1970.delete
1980JSR cursor_off
1990SEC:LDA ptr:SBC #1:STA
temp:LDA ptr+:SBC #0:STA
temp+: \temp=ptr-1
2000LDY #0:LDA #32:STA (te-
mp),Y \delete
2010JMP xleft \x=x-1
2020\-----
2030.cursor_off
2040LDY #0:LDA (ptr),Y:JMP
oswrch
2050\-----
2060.cursor_on
2070LDA #17:JSR oswrch:LDA
#0:JSR oswrch \COLOUR 0
2080LDA #17:JSR oswrch:LDA
#129:JSR oswrch \COLOUR 1
29
2090LDA #31:JSR oswrch:LDA
x:JSR oswrch:LDA y:JSR osw-
rch \TAB(x,y)
2100LDY #0:LDA (ptr),Y:JSR
oswrch \print char under
cursor
2110LDA #17:JSR oswrch:LDA
#1:JSR oswrch \COLOUR 1
2120LDA #17:JSR oswrch:LDA
#128:JSR oswrch \COLOUR 1
28
2130LDA #8:JSR oswrch \ba-
ckspace
2140RTS
2150\-----
2160.scroll_down
2170LDA line:BEQ end_scdt:
DEC line

```

2180JSR window  
2190LDA #30:JSR oswrch:LDA  
#11:JSR oswrch \hometcurs  
or up  
2200SEC:LDA top\_line:SBC #  
48:STA top\_line:LDA top\_line+1:  
SBC #0:STA top\_line+1  
2210LDA #26:JSR oswrch \ca-  
ncel window  
2220.end\_scrd  
2230RTS  
2240-----  
2250.scroll\_up  
2260LDA line:CMP #maxlines:  
BEQ end\_scru:INC line  
2270JSR window  
2280LDA #31:JSR oswrch:LDA  
#0:JSR oswrch:LDA #22:JSR  
oswrch \TAB(0,23)  
2290LDA #10:JSR oswrch \do-  
wn  
2300CLC:LDA top\_line:ADC #  
40:STA top\_line:LDA top\_line+1:  
ADC #0:STA top\_line+1  
2310LDA #26:JSR oswrch \ca-  
ncel window  
2320.end\_scrd  
2330RTS  
2340-----  
2350.print\_screen  
2360LDA #31:JSR oswrch:LDA  
#0:JSR oswrch:LDA #1:JSR o-  
swrch \TAB(0,1)  
2370LDA top\_line:PHA:LDA t-  
op\_line+1:PHA \save top\_li-  
ne  
2380LDA #23:STA counter  
2390.ploop  
2400LDY #0  
2410LDX #40  
2420.ploop1  
2430LDA (top\_line),Y:JSR o-  
swrch  
2440INY:DEX  
2450BNE ploop1  
2460CLC:LDA top\_line:ADC #  
40:STA top\_line:LDA top\_line+1:  
ADC #0:STA top\_line+1  
2470DEC counter  
2480BNE ploop  
2490PLA:STA top\_line+1:PLA  
:STA top\_line  
2500RTS  
2510-----  
2520.xright \x=x+1  
2530LDI x:LDY y  
2540INX:CPX #40:BEQ xrl \x=40?  
2550.xr2

2568STI x  
2578CLC:LDA ptr:ADC #1:STA  
ptr:LDA ptr+1:ADC #0:STA p  
tr+1 \ptr=ptr+1  
2588.end\_xr  
2598RTS  
2608.xr1 \end of line  
2618CPY #23:BEQ end\_xr \c  
an't if x=39 & y=23  
2628INY:STY y  
2638LDX #0:BEQ xr2  
2648\-----  
2658.xleft \x=x-1  
2668LDX x  
2678DEX:BMI x11 \x<0?  
2688.xr2  
2698STX x  
2708SEC:LDA ptr:SBC #1:STA  
ptr:LDA ptr+1:SBC #0:STA p  
tr+1 \ptr=ptr+1  
2718.end\_xl  
2728RTS  
2738.x11 \x=0  
2748LDY y:DEY:BEQ end\_xl  
\can't if at 0,1  
2758STY y  
2768LDX #39:BNE xr2  
2778\-----  
2788.cursor\_down  
2798JSR cursor\_off  
2808LDY y:CPY #23:BEQ bott  
om \at screen bottom?  
2818INY:STY y \y=y+1  
2828CLC:LDA ptr:ADC #40:ST  
A ptr:LDA ptr+1:ADC #0:STA  
ptr+1 \ptr=ptr+40  
2838RTS  
2848.bottom  
2858LDA line:CMP #maxline:  
BEQ end\_cd \at bottom of t  
ext?  
2868JSR scroll\_up  
2878CLC:LDA ptr:ADC #40:ST  
A ptr:LDA ptr+1:ADC #0:STA  
ptr+1 \ptr=ptr+40  
2888LDA #129:LDX #ND6:LDY  
#FF:JSR osbyte:TYA:BNE bot  
tom \scroll again?  
2898.end\_cd  
2908JSR print\_screen  
2918JSR fx21  
2928JMP line\_number  
2938\-----  
2948.cursor\_up  
2958JSR cursor\_off  
2968LDY y:DEY:BEQ top \at  
screen top?  
2978STY y \y=y-1  
2988SEC:LDA ptr:SBC #40:ST

Line: 039 Esc=Menu

→ The Return key takes the cursor to the start of the next line and delete backspaces and deletes as normal. → To start a new line or paragraph in the document you must enter a carriage return by pressing function 8 it looks like a bent arrow on screen. Note that this does not start a new line on the screen, it only comes into effect when you print the text and there's no need to move to the start of a new line on the screen. Carry on typing straight after the carriage return. → Function 1 enters a Tab character which is equivalent to inserting five spaces. It looks like a right arrow on screen and is useful at the start of new paragraphs. →

```

A ptr:LDA ptr+1;SBC #0:STA
ptr+1 \ptr=ptr-48
2990RTS
3000.top
3010LDA line1;BEQ end_cu \
at top of text?
3020JSR scroll_down
3030SEC:LDA ptr:SBC #40:ST
A ptr:LDA ptr+1:SBC #0:STA
ptr+1 \ptr=ptr-48
3040LDA #129:LDX #4C6:LDY
#FF:JSR osbyte:TYA:BNE top
\scroll again?
3050.end_cu
3060JSR print_screen
3070JSR fx21
3080JMP line_number
3090\-----
3100.line_number
3110LDA #31:JSR oswrch:LDA
#6:JSR oswrch:LDA #B:JSR o
swrch TAB(5,0)
3120LDA line \get line nu
mber
3130LDX #100:JSR digit
3140LDX #18:JSR digit
3150LDX #1
3160.digit
3170STX temp
3180LDX #47
3190SEC
3200.loop
3210INX
3220SBC temp:BCS loop
3230ADC temp:TAY
3240TXA:JSR oswrch
3250TYA:RTS
3260\-----

```

*This listing is included in this month's cassette tape offer. See order form on Page 53.*

# FORMULA 1

LAST year I spent many an hour writing an arcade adventure called Citadel for the BBC Micro and Electron for Superior Software from my home in Denmark.

Some of the screens have several animated monsters and many complex calculations have to be done.

With the BBC Micro speed is no problem, but I was afraid the Electron version would be too slow.

This is because the Electron has slow RAM and lacks some of the dedicated processors that are found in the BBC Micro.

So it has to compensate by doing the same tasks – like video and keyboard handling – in software.

This means that a machine code program runs at half the speed of the BBC Micro in Modes 4 to 6 and is more than four times slower in Modes 0 to 2.

The only answer was to find ways of speeding up the Electron so that Citadel would be as playable as the BBC Micro version.

If I hadn't discovered the methods outlined below the game would never have been released for the Electron.

To show how easy it is to speed up the Electron enter Program 1.

It takes about 6.6 seconds to execute on an unexpanded Electron and 8.9 seconds on one fitted with a Plus 1.

However if a key is pressed while the program is running the time taken is 9.4 seconds and 14.7 seconds respectively.

If you have a Plus 1 fitted

```
10 REM PROGRAM 1
20 MODE2
30 TIME=0
40 FOR Y=0 TO 1020 STEP
50 MOVE 0,Y:DRAW 1272,Y:NEXT
50 PRINT "TIME"
60 #FX15,1
```

Program 1

By MICHAEL JACOBSEN

add the following lines:

```
22 #FX163,128,1
23 #FX163,128,0
```

This turns off the analog interface (ADC), and the program runs as fast as on an unexpanded Electron. Now enter:

```
24 #FX178,0,0
25 #FX178,255,0
```

This stops the keyboard interrupt while the program is running and now the time taken is only 6.4 seconds, no matter whether keys are pressed or not.

As you can see if you run a game on an Electron with a Plus 1 which uses the keyboard it is possible to increase the speed by 230 per cent.

If you just want to do calculations or draw a new screen in a game you could add these lines:

```
260 LD MODE=?&282:&282=1&01:?
&FE07=&E0
98?&282=OLD MODE:&FE07=OLD
0DE
```

This turns the screen off and the program only takes 3.1 seconds. Compared with the 14.7 seconds in the worst case, this is an increase in speed of more than 470 per cent.

Note that it is not enough just to poke a value into &FE07, as the operating system switches back to the old mode stored in ?&282 if sound is used.

As the above example illustrates, a program is slowed down considerably when the keyboard is used.

It is easy to stop the keyboard interrupt using #FX178,0,0. However this means that we can no longer get input from INPUT, GET or INKEY.

This is fine though if the

program is just doing calculations or if a joystick is used.

When the keyboard is disabled the OS is no longer told what is happening to the keyboard. However it is still possible to read the keyboard – you just have to access the hardware directly. This is only possible from machine code.

Program II reads the keyboard directly and tests the keys \*, X, ., Z and Return. If you run the program you can move a character around the screen. Now insert the line:

```
235 #FX178,0,0
```

to disable the keyboard and the program runs faster, but you can still control the character from the keyboard.

The keyboard is treated as ROM number 8 and any key can be read just by reading a certain bit from this. Each column of four keys on the keyboard share a byte of memory in it.

Table I shows which bit of which byte you must test to read any key. For instance the seventh column consists of the keys G, Y, H and N.

These keys share a byte at &BF7F. Bit 0 of &BF7F tells if G is pressed, Bit 1 if Y is pressed and so on. Bits 4 to 7 have no significance.

To read the keyboard you

must first select the keyboard ROM. The current ROM number is stored at &F4 and &FE05, so you must write to these addresses. It can be done like this:

```
LDA #8
STA &F4
STA &FE05
```

If you wish to know if Y is pressed you must read location &BF7F, so we simply use:

```
LDA &BF7F
```

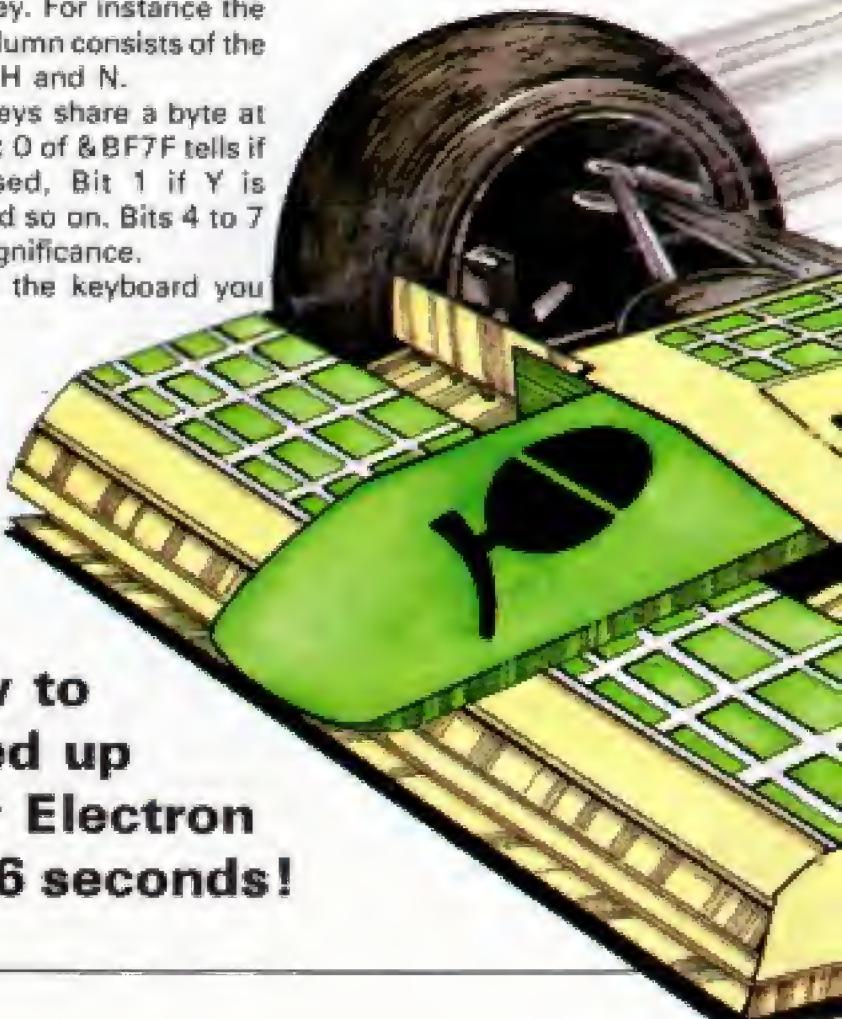
and test if Bit 1 is on:

```
AND #1
```

The key Y is pressed if the accumulator is non-zero.

When the keyboard ROM has been selected any key can be tested using just five bytes. This way of testing a key is almost the same as using INKEY (-X) or osbyte &79, but much faster.

Program II saves memory by creating a table containing the addresses of the keys and a mask table to test the correct bit for each key. The result is



stored in a key table.

If you wish to return to Basic or any other language from machine code you must reselect the old ROM. This is done by poking the old value of &F4 back into &F4 and &FE05.

Note it is not enough just to poke a value into &FE05 as the operating system will take the contents of &F4 and put it into &FE05 when it gets a chance.

If you wish to read a string of keys, for instance to add a name to a highscore table, it is easier to enable the keyboard using \*FX178,255,0 and do it the old way.

If you have a Plus 1 the ADC will interrupt your program just like the keyboard does. The ADC can be turned off using \*FX163,128,1.

Now what if you wish to read a joystick? Easy, read it directly. To read an ADC channel directly you must poke a value into location &FC70. The value for each channel is:

Channel	Value
1	4
2	5
3	6
4	7

To read channel 1 you would use ?&FC70=4. Then you must wait until the ADC has finished the conversion. When the 1 byte value from

that channel is ready Bit 6 of &FE72 becomes 0. You could test it like this:

```
REPEAT:UNTIL(?)&FC72  
AND&40)=0
```

Now the value of that channel can be read as a 1 byte value at &FC70.

I=?&FC70

If you wish the result to be compatible with ADVAL(1-4) multiply the result by 256. The problem about this and the normal method of reading a joystick is that a lot of time is spent waiting for the conversion to finish.

It would be better if we could ask the ADC to read a channel and then do something else while it is converting.

Program III uses an event routine to read channels 1 and 2 without any delay. Once the event is started you can read the X and Y channel just by reading ?Joy and ?Joy.

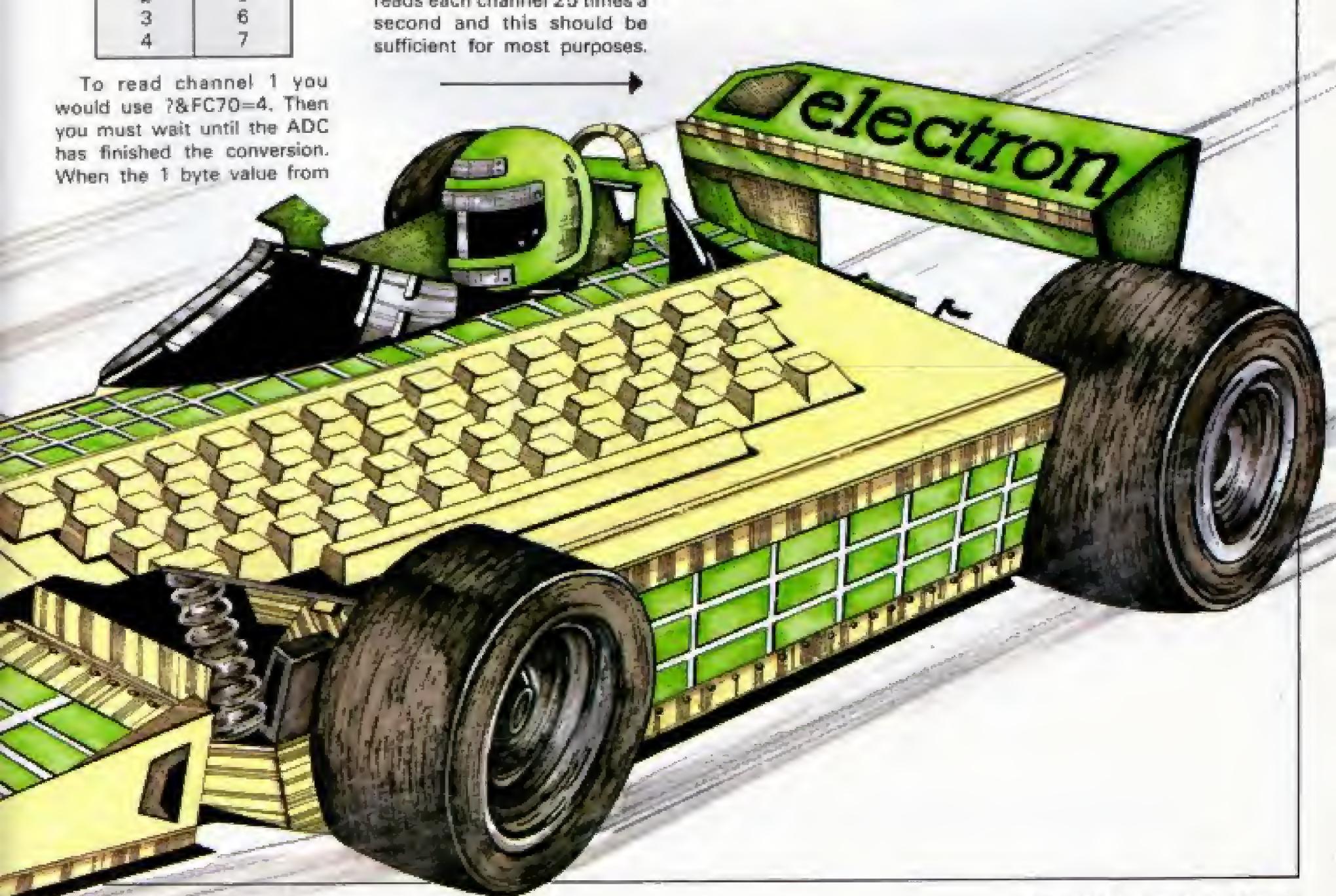
You could use the ADC conversion complete event, but I have used the start of vertical sync event as it only interrupts 50 times a second.

This means that Program III reads each channel 25 times a second and this should be sufficient for most purposes.

```
10 REM PROGRAM II  
20 REM Direct Electron X  
Keyboard Read  
30 REM Michael Jakobsen  
40 REM Enter 235#FI178,0  
,0 for fast mode  
50 MODE2  
60 Key=&70:Keyadd=&80:Ke  
ymask=&8A:Oldrom=&7A  
70 FORI=8T04:READA,B:?(K  
eyadd+I#2)=A:?(Keyadd+I#2+1  
)=A DIV&100:Keymask?I=B:NEX  
T  
80 REM * I ?  
90 DATA&BFF8,4,&B7FF,8,&  
BFF7,8  
100 REM 2 Return  
110 DATA&AFFF,0,&BFFD,4  
120 FORI=8T02STEP2:PZ=AC  
00:[OPT]I  
130 \ Remember Old Rom  
140 .Rkb:LDAM&F4:STA Oldro  
m  
150 \ Select Keyboard Rom  
160 LDAB:STA&F4:STAN&E0  
5  
170 \ Read Keys
```

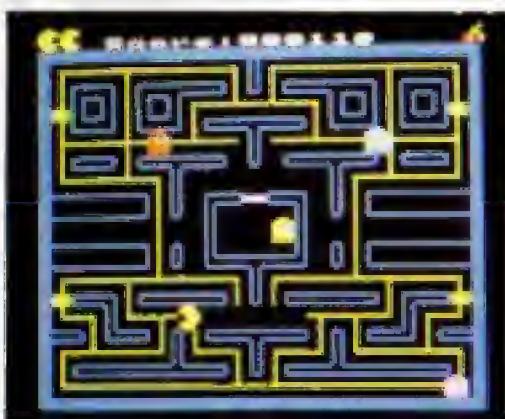
```
180 LDX#0:LDY#4  
190 .Rkc:LDA(Keyadd,X):AN  
D Keymask,Y:STA Key,Y  
200 DEX:DEX:DEY:BPL Rkc  
210 \ Back To Old Rom  
220 LDA Oldrom:STA&F4:ST  
A&FE05  
230 RTS:]:NEXT  
240 REM Test Keys ~  
250 I=18:Y=15:C=1  
260 VDU23;82#2;0;0;0;  
270 REPEAT  
280 CALL Rkb  
290 IF Key?0THENY=Y-1:IF  
Y<0THENY=0  
300 IF Key?1>0THENY=Y+1:  
IFY>19THENY=19  
310 IF Key?2>0THENY=Y+1:  
IFY>30THENY=30  
320 IF Key?3>0THENY=Y-1:  
IFY<0THENY=0  
330 IF Key?4>0THENC=C+1:  
IFC>7THENC=1  
340 COLOUR C:PRINTTAB(I,  
Y);"  
350 UNTIL0
```

Program II

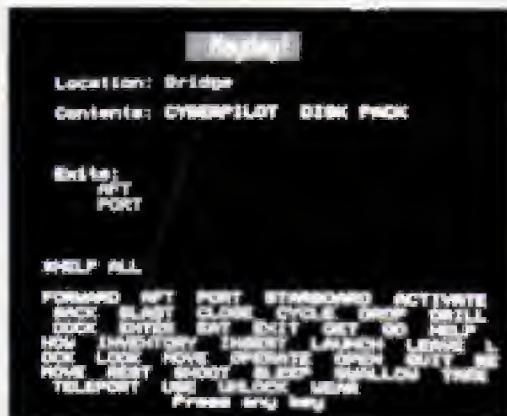


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TO ORDER TURN TO THE FORM ON PAGE 53

## From Page 41

The fire-buttons are read as:

**Fire1=(?&FC72 AND &10)**

and

**Fire2=(?&FC72 AND &20)**

The result is zero if a button is pressed. If you want the result to be non-zero when a button is pressed use:

**Fire1=(?&FC72 AND &10)EDR&10**

together with:

**Fire2=(?&FC72 AND &20)EDR&20**

Finally if you wish to read the fire-buttons exactly as with ADVAL(0):

**Fire=(?&FC72 AND&38)/&10  
EDR3**

Using the above methods it is possible to make your Electron run 230 per cent faster even with a Plus 1 fitted.

If you think it sounds a bit

confusing just experiment a little. You will see it is quite easy to adapt the methods in your own programs.

This is an absolutely free way of getting a Formula 1 Electron.

Finally, the Electron keyboard consists of 14 columns each with four keys. Table I contains the addresses in the keyboard ROM of the 14

columns (0-D and the keys that can be read at each address).

The addresses have been calculated as Add=&BFFF-2^Column. The first key listed at each address is Bit 0 and the last key is Bit 3.

Note that the keyboard is selected as ROM number 8 or 9, both are equivalent. Basic is ROM number 10 or 11.

Column	Address	Bit: 0	1	2	3
0	&BFFE	Right	Copy	NC	Space
1	&BFFD	Left	Down	Return	Delete
2	&BFFB	-	Up	:	NC
3	&BFF7	0	P	:	/
4	&BFEF	9	O	L	-
5	&BFDF	8	I	K	,
6	&BFBF	7	U	J	M
7	&BF7F	6	Y	H	N
8	&BEFF	5	T	G	B
9	&BDFF	4	R	F	V
A	&BBFF	3	E	D	C
B	&B7FF	2	W	S	X
C	&AFFF	1	Q	A	Z
D	&9FFF	Escape	Caps Lk	Ctrl	Shift

NC = No connection

Program III

Table I

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# Solving the riddle of the Sphinx save game routine

THE response to my request for a save game routine for *Sphinx Adventure* has been very good.

The first person to send me a routine was John Cummings and he wins a copy of *Woodbury End* and *Terrormolinos*, both of which are superb adventures.

I have listed below the changes that need to be made to Sphinx.

Still on the same subject:

Rob Harley has written to say that I made a mistake when I said that the bad program fixer was in the December 1985 issue of *Electron User*. In fact it was in the December 1984 issue.

Rob goes on to say that there is a bug in Sphinx. If you type in '' as a response to the What Now? prompt, the game crashes.

However typing in directly `7&5774=&FF` and then typing

in RUN gets the game running again. Rob goes on to say that issuing an `*FX200.0` can prove handy too.

M. Wheeldon is our first Lord of Adventure. He has written in offering help on three adventures. See below for more details.

You will have noticed that I have been printing a series of maps of *Terrormolinos*. If there are any other maps you would like let me know.

```
44 LOMEM=k59BA:D$="nnewu
d*:KN=0:MS=0:S=0:WA=0:0=3C0
0:EX=k7B:L=6
202 A$=FNCV(A$):IFLEFT$(A
$,3)="inv"PROC1:GOTO 191
ELSE IF A$="load"PROC10 ELS
E IF A$="save"PROCsa
2000 DEFPROClo
2005 LOCAL1,f
2010 PROCf
2020 f=OPENIN(f$)
2030 FOR I=0 TO 255
2040 INPUT#f,? (I+&C00)
2050 NEXTI
2060 INPUT#f,L,S,KN,MS,S,W
A,K,W,I,X,T,CH,VO,KL,CF,D,
SA,FL,LI,C,V,B,BE,RA,LF
2080 CLOSE#f:A$="look":END
PROC
```

```
2090 DEFPROCsa
2095 LOCAL1,f
2100 PROCf
2110 f=OPENOUT(f$)
2120 FOR I=0 TO 255
2130 PRINT#f,?(I+&C00)
2140 NEXTI
2150 PRINT#f,L,SC,KN,MS,S,
WA,K,W,I,X,T,CH,VO,KL,CF,D
,SA,FL,LI,C,V,B,BE,RA,LF
2170 CLOSE#f:A$="look":END
PROC
2180 DEFPROCf
2190 INPUT"filename?":f$:IF
LEN f$ > 7 OR LEN f$ < 1 VDU 7:P
PRINT:GOTO 2190
2200 *OPT1,1
2210 ENDPROC
```

## FEEDBACK

Linda Smith has written in with help for Harvey Reynold's problems in *Ghost Town*. You can't play the mirror, even though you think you should be able to.

You should TAKE BELL, GO EAST from the counter in the hotel, RING BELL, MOVE BED and TAKE TAPE.

Go back to the saloon and TAPE MIRROR, BREAK MIRROR, GO HOLE, PASS BOARD, TAKE \$200 and TAKE BOARD. When the ghostly pianist appears CLAP, PLAY PIANO, OPEN PIANO and READ MAP.

Geoff Larsen has written in again with lots of help with

previous problems. To start with he has taken me to task for giving wrong information about *The Count*.

You do have to go into the oven, but go in at night when it is cooler.

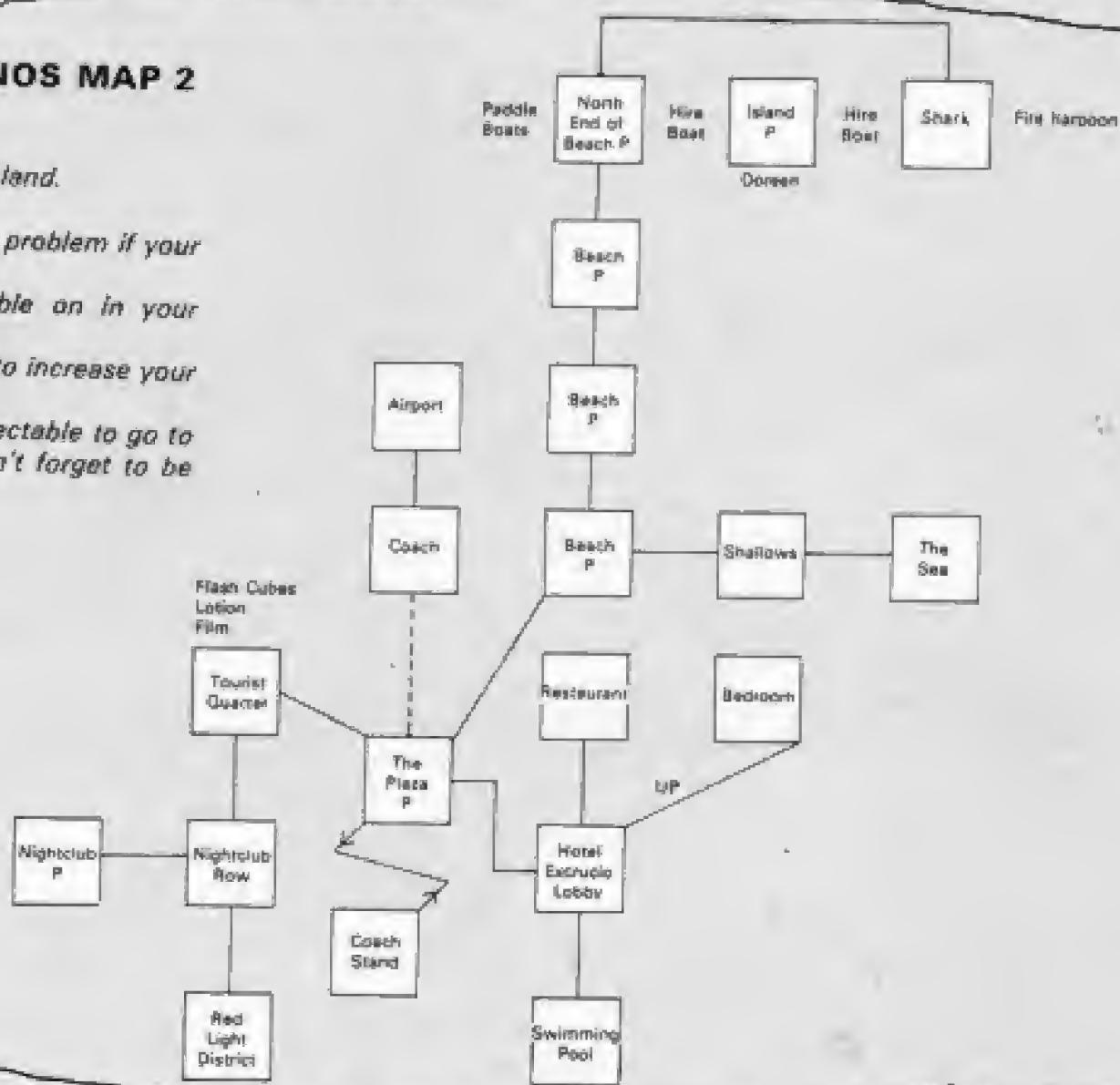
With regard to Harvey Reynold's problem in bringing the telegraph keys together in *Ghost Town*—move the large safe in the telegraph office and repair the two loose wires.

Now press the second key in the line shack across the ravine — with the gunpowder having been left in a keg in the telegraph office.

In *Pyramid of Doom* you don't need to shoot the

## TERRORMOLINOS MAP 2

P = Take photo.  
 Call Doreen on the island.  
 Swim in the sea.  
 Sunstroke is a knotty problem if your hanky isn't on right.  
 Put something suitable on in your bedroom first.  
 Eat in the restaurant to increase your score - a bitter pill.  
 Wear something respectable to go to the nightclub and don't forget to be flash.



## LORDS OF ADVENTURE

This section is devoted to ardent adventurers who are prepared to answer reader's questions on particular games.

Write to them if you need help with the games mentioned, but please

remember to send an sae with your letter.

M. Wheeldon of 225 Pensby Road, Pensby, Wirral, Merseyside offers help with *Twin Kingdom Valley*, *The Eye of Zoltan* and *Firienwood*.

nomad. If you have the gun he seems less likely to attack you anyway.

In *Spiderman* the block of ice is the frozen aquarium.

*Terrormolinos* has raised quite a few problems over previous months and Geoff has provided answers for these too.

Snorkelling in the bay will earn you more points. To take an excursion you should GO BULL, GO WINE or GO MONASTERY. To take the camera off the shelf you must first get and lock the steps and then climb them.

You also use the ladder to get to the loft and typing

SWITCH ON will shed a bit of light on the scene. Geoff says that he has finished *Strange Odyssey* without translating the writing on the boulder.

In *Escape from Pulsar 7* you must have first fixed the oven before you can bake the cake. To do this, a round block must be constructed from a square block on the repaired lathe.

In *Arrow of Death Part 2* Andy Hollis should use the large rock and SMASH SKELETON.

If anyone is a candidate for Lords of Adventure Geoff is. I hope you will put your name forward Geoff.

## PROBLEM CORNER

J.J. Foggitt has written in with questions about several adventures. In *Castle of Riddles* he keeps drowning in the boat.

Yes, you need the bucket. Don't try to dig it out, just keep TAKING it. Then when you get to the boat bail out.

Don't just use an explosion to get rid of the giants, use it to open a box as well. When the giants have gone explore the gallery to find another treasure.

You'll find your score will increase when you put things in the safe. Haven't you

### SOS

Linda Smith is having trouble with *Ghost Town*. She wants to know if there is a word that will make the horse carry you rather than throw you off.

She also wants to know if you can get to the mountains, open the safe and what use are the fiddle strings. Can anyone help her out with these?

wondered what those letters on the wall mean? There's one in each location, they aren't all in one location.

In *Bored of the Rings* try inserting the battery into the vending machine. I'm not sure where location 17 is, but try planting some beans there.

Peter and Val Russell need to find Mr Snargsby to finish *Terrormolinos*. Go down into the catacombs, find him and call him.

The problem of finding the parachute in the forest in *Stranded* has cropped up again. Paul Dougherty says that he has tried CLIMB TREE, but gets the response "You can't do that now".

The reason for this Paul is that you are trying in the wrong place. Go north from the first location you come to in the forest and then try.

I have checked this on the game itself as well as on my map and it definitely works.

Susan Parsons and Robert Carlton have both written in

## From Page 45

asking for help with *Dracula Island*.

The heavy thing is an iron ball and you can find it by going down in the hut near the start location, though you will have to have the knife and crucifix to get past the snake first.

Susan also needs to get the ball but should get the gloves from the armchair in the library first, then go back to the hut and DROP ROPE, LIGHT

LANTERN, WEAR GLOVES and CLIMB ROPE.

If you sit in the armchair and drop the ball you can now find a secret door in the kitchen.

M. Wheeldon is having problems with *Five Stones of Anadon*. Move the tombstone in the cemetery.

Wear the gloves and get the plank, then go down. Use the plank to cross the pit and when you get to the rubble use the dynamite. You will soon find the cross.



## HALL OF FAME

### *Woodbury End* – Les Shipton

Here are some more clues:

- Bright light child's delight. Switch the beacon on in the auditorium.
- The bell can end the hall. Take the children to the village green when the clock chimes at midnight.
- Circular logic rules. Run around the oak tree to gain access to the fairground. RUN NORTH, RUN EAST, RUN SOUTH, RUN WEST, RUN NORTH then GO NORTH.
- Pal in drome – not quite. To gain access to the chambers in the fairground move east from the door with the bat.

### *Wheel of fortune (continued)* – Craig Romans

Explore the area you arrive at and head for the road leading south. You will hear a bird singing. Play the music box to get rid of it.

Now go to the china shop and ring the bell for service. Do what the man tells you and find the farmer. When you have found him tell him THE BULL IS IN THE CHINA SHOP and lead him to it. You will be rewarded with another penny.

Now go back to the field and explore it thoroughly. If you haven't managed to get past the snake you must drop the basket and play the flute.

Take the basket again and go to the canal bank. When you see the troll drop the basket and play the flute. The troll will run off and you can now enter his cave. You can leave your treasures here in safety.

Now go and fill the cup with oil, but remember to leave the basket outside the cave so that the troll can't get back in.

If you have got the silver bullet with you you should now go back up through the trapdoor. Go to the machine and insert the penny and get the gun.

Load the gun with the bullet and go to the well and get the bucket. Go to the building and spin the wheel.

### *Spiderman (continued)* – Robert Henderson

When you see Dr. Octopus grab his arms and hit Electro. Now go to the penthouse and lower the thermostat until it is less than 32 degrees.

Then go to floor 1, get the aquarium and take it to the hall. Go back to the penthouse and turn the thermostat back up. Go back to floor 1 and get the gem out of the aquarium.

Take everything you can carry, including the aquarium, Electro, the couch and so on, and drop it all on the giant scale.

Now go to floor 3 and type RUN on the computer. Go to the presses and get the newspaper, open it and get the gem. There are also gems in the lift shaft's tool niches. You must

leave gems with Madame Web regularly or your inventory will soon fill up. In addition to gems I have mentioned there are also some just lying about but you'll have to find them.

When you have deposited all the gems with Madame Web type SCORE. The chief examiner will appear and tell you a password.

### *The Count (continued)* – A.J. Haynes Day Two.

Raise the dumb waiter to the pantry. Take the matches, sheets and garlic and go down in the waiter to the dungeon. Find the pit and tie the sheets to the rings.

Climb down into the pit and light a match to reveal a torch. Climb back up the sheets and go to the front door and wait for the package – postcard and note – to be delivered.

Take everything to the closet, open the package and store it all here – except the blood and clip. Lock the door and go back to bed and sleep.

### *Revenge of Zor* – H.J. Bastien Some more hints that should help:

Rub the ring to kill the hydra. Wear the spectacles to read the book. Use the casket to keep the torch and matches dry.

Examine the sandwich to get the flies and eat the sandwich to move the boulder.

The key is behind the waterfall. GIVE COINS to enter the carriage. Make sure you have the right objects before entering – once in, you can't get back.

### *Robin of Sherwood* – Martin Hanson

First of all you must escape from your cell so STAND on the PRISONERS and then GRAB the guard's ANKLE when he passes overhead.

Then STRANGLE GUARD, EXAMINE GUARD, GET SWORD, PULL BOLT and OPEN GRATING. Next GO DOOR, GO BATTLEMENTS, GO DOOR, GO RIGHT and GO WINDOW.

You now need to map out the forest. From your start location in the forest imagine you are on a horizontal line. You can move three locations east and four locations west.

At no point on this line can you move south. Including your start location the map extends for eight locations vertically.

This means that there are 64 locations on your map (8x8). There are also several locations outside this square.

Your first task is to explore the limits of the map and discover these extra locations then compile a map to show all the locations both inside and outside the square.

# Micro Messages

I HAVE had an Electron for just over a year. In that time I have added a Plus 1, an HR5 printer and recently the Plus 3.

The computer has been used for Scout records, letters, and training. A morse code program was very useful for the communications badge. (Four of the boys also have Electrons.)

At the local gala road race the computer was used to keep those waiting at our town hall start/finish up to date with the race.

The details of 250 runners were programmed in. Their numbers were radioed over Citizens Band from the refreshment/first aid points on the route.

They were entered into the Electron which displayed on monitors the runners' position, time, and details for the waiting crowd and for the race controllers to announce over the public address system. This was very successful.

I am also involved with the local dramatic society as theatre electrician for lighting, sound and effects.

At two productions, both requiring fairly complex and fast sound effect plots, I used the Electron programmed with \*MOTOR commands and TIME delays to cue the taped sound effects.

The monitor was used to display instructions and cue lines for the operator. This allowed my colleague to stand in successfully after only one practice.

This method of controlling the cassette player is much better than watching the tape counter and controlling the cassette manually.

It makes possible putting all the sounds on one tape as the sound required next can be called very quickly by pressing say the Spacebar.

The problem with this system is that it is under the control of the one relay inside the Electron. Are there any publications available which could be of help in making a circuit to control other relays via, say the Plus 1 ROM sockets?

This would greatly increase

## Electron proving a Jack of all trades

the possibilities for computer controlling many other low voltage powered effects at present requiring manual switching — Ian Johnston, Moffat, Dumfriesshire.

- We don't know of any publications describing the use of the Plus 1 ROM socket.

Advanced Computer Products are working on a Plus 5 interface which may be suitable for control applications.

### Parents often know best

I FEEL for O. F. Foreman (Micro Messages, June 1986). However, in my children's school they believe satisfactory educational software can never be commercially produced; only teachers, in day-to-day contact with pupils, can assess requirements accurately.

Accordingly, they write their own software as far as possible — most teachers under about 40 have used computers in some form at university.

If they get bogged down, they write to parents for advice. After all, there are many parents nowadays who

use computers at work.

Besides, we know the latest tricks of the trade to shorten programs.

Such programs are copyrighted in the name of the school but no fees are expected or paid. We parents also are vitally interested in our children's education!

Come on, Mr Foreman. If you can't write the software yourselves, swallow your pride and ask the parents. You will be astonished by the response.

How many commercial software packages do you think are not amended by users to suit individual company quirks? Do you expect your traditional chalkboards to write themselves?

Computers are a useful tool at any school but software must be the smallest problem.

— R. H. Hill, Woodford Green, Essex.

### Clues for Commando

I HAVE some hints for the Electron version of Commando. First of all do not try to shoot masses of enemy soldiers while you are in no man's land.

Find some cover to hide

they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

behind before you start to eradicate the enemy soldiers. If there are any mortars in the vicinity, get as close as possible to them and either fire a round or throw a grenade.

Throwing grenades at mortars is recommended because you do not have to get as near to the mortar emplacement and thus the risk of death is far less.

This method of killing lots of soldiers is best used at the start of the game because you can increase your number of lives from three to around nine — the more lives you can obtain the better your chance of completing the game.

Also collect as many boxes of grenades as you can. Do not bother throwing grenades at single soldiers because this is uneconomic.

When you arrive at a bridge throw a grenade just before you enter the tunnel and walk in the central part of the tunnel, so you can avoid any surviving soldiers.

When you arrive at the opening gates, move in line with the opening and throw a grenade. This will kill the first soldiers who come through the gate and give you more time to manoeuvre.

Keep firing bullets while soldiers are coming at you from any direction; this will kill most of them.

On the second level there is a camp in front of the second gate and quite often a soldier hides here.

To kill him move to the bottom of the relevant side of the screen and fire bullets or throw grenades. If this method fails, wait and the soldier will move out from behind the camp, when you can shoot him.

On the third level there are no real problems apart from



## From Page 47

two mortars just before gate three. Again throw grenades to destroy these emplacements.

Level four, the final one, is very simple. Again use grenades wisely. The rules for gates also apply at the fortress.

From there hints you will be able to tell I have completed the Electron version of Commando. Am I the first to do this? — David Tester, Bolton, Lancs.

● You're certainly the first reader we've heard of to complete the game. Thanks for the hints and tips.

## In need of a new Elite

ARE all you Elite fans now bored with it, having become Elite? If so get writing to Acornsoft and convince the authors of this great game that we need a follow-up.

Maybe an even more futuristic game with a new faster, powerful type of ship — the Cobra Mk IV maybe?

Once you have achieved Elite status and have all the "bolt-ons" for it, the game is far too easy, I'm sure you'll agree.

So start writing and maybe they will see the advantage of such a game. After all, the original did sell very well. — Commander Scorpio, (Elite).

## Splash got me in deep water

AS an experienced typist, but a newcomer to typing in computer listings, I would like to call your attention to the game "Splash it all Over" in November 1985 issue of Electron User.

Many beginners must have found this program impossible to do without consulting an expert — which I had to do before overcoming the problem.

I am referring to line 640 which cannot be typed completely unless abbreviations

WHAT would you like to see in future issues of Electron User?

What tips have you picked up that could help other readers?

Here is your opportunity to share your experiences.

Remember that these are the pages that you

write yourselves. So tear yourself away from your Electron keyboard and drop us a line.

The address is:

Micro Messages

Electron User

Europa House

68 Chester Road

Hazel Grove

Stockport SK7 5NY.

are used, but you made no mention of this.

I can only type to the final VDU whereupon the computer goes on strike and refuses to accept any more of that line. — F. Harvey, Longford, Coventry.

● Occasionally you will come across lines that are apparently too long to fit in and the Electron simply refuses to accept them.

In these cases using the abbreviations listed in the Electron User Guide will solve the problem.

As all submissions to Electron User must be on tape or disc so they can be thoroughly tested we never actually type them in. Consequently this problem can easily be missed.

## Has backup broken down?

I RECENTLY bought an Electron with Plus 3 disc drive unit. Like M. Lowdon (Electron User June, 1986), I am unable to successfully transfer the Acornsoft Database program to a blank formatted disc.

I have tried using the Welcome disc utility "BACKUP". However I think that there must be a bug in this particular program.

The basic problem is that the program fails to terminate — no prompt reappears and/or no instruction is given to say that the copying process is completed.

The computer continually gives the instruction to swap the source and destination discs.

After swapping for 20 or 30 times, if this process is terminated by Control and

Break, the database program has been copied on to the blank disc, although it is corrupted. Various error messages appear when any attempt is made to use the backup copy.

I have also used "DIRCOPY", following the instruction on page 11 of the Plus 3 manual and user guide errata (press Return twice in place of "Library" to backup the whole disc).

Once again, I have been able to make a copy onto a blank disc, but when attempting to add records to a file the program crashes and the error bad program appears.

Incidentally, I obtained a replacement Welcome disc from Acorn but the same problems are apparent.

Can you tell me what is wrong? Is there a fault on my computer or disc drive unit? — P. Harmes, Buckley, Clwyd.

● Nothing is wrong with the backup utility on your Welcome disc or your Electron or drive, the utility is simply very slow at copying discs and requires around 80 disc changes.

If you press Break after 20 or 30 disc changes only part of the disc will have been copied and the rest will have been corrupted.

A Plus 3 disc stores over 320,000 bytes of information and the Electron only has around 17,000 bytes of RAM free.

This means that even if all the free memory could be used a disc could only be copied in chunks of 17k, and each chunk requires two disc changes. That adds up to about 36 changes.

You'll find a fast backup utility in the February 1986

issue of Electron User which reduces the number of disc changes to around 25.

## A routine check-up

SINCE owning a Plus 3 disc drive I have been successfully using the downloading routine included in your listing of Skramble to load games from disc.

Recently however I have found two examples which will not run using this routine.

These are Time Bomb and Higher or Lower both from July 1985 issue of Electron User.

These games produce the error 'No room at line ...' yet both work perfectly when loaded from cassette with Page set to &E00.

Do you know how the games can be run from disc? — Stephen Thomas, Bishopsworth, Bristol.

● The solution is quite simple: Define function key 0 to download the program using:

```
*KEY0 +T.1:MDI=PAGE-&E00:FOR  
1=PAGE TO TOP STEP  
4:!(IX-01)=IX:NEXT:PAGE=&E  
00:MOUD:MRUN:M
```

then when the program has loaded press f0 to run it.

Actually adding the function key definition to the listing may cause it to run out of memory.

## Invasion Force out of line

ALTHOUGH the discovery of your magazine has vastly increased my understanding of the Electron I do have one small complaint to make.

Having faithfully typed in the listing of Invasion Force in the April 1986 issue I was not amused to find it wouldn't run.

The fault seems to exist in line 100, and no matter how many times I check it the result is always the same.

Please tell me that the listing is incorrect. I would hate to think that my wife, next door neighbour and myself are all going blind.

The error message is No

# Super show, but no space

I HAVE just returned from another superb Electron and BBC Micro User Show – all-be-it rather jaded after the crush. Well done Database Publications for continuing to support the BBC Micro and Electron as you do.

Several items come to mind after this visit which I feel to be worthwhile a mention in your columns, and to the interest of your readers.

Firstly the show itself. So much to see, but even with my own 6ft 4in and 17 stone, great difficulty in being able to see much due to the sheer volume of human bodies in such a confined space, and this on the first day.

Any children, and this included by own son who accompanied me (this day off school considered to be of great education value) had great difficulty in being able to get near any of the stands.

I was concerned also for the several disabled persons in wheelchairs – their task on Friday was almost impossible.

Is it not time that Database considered an exhibition centre which will adequately house the show, even if this means higher entrance fees?

The freedom of movement and ability to see all would more than compensate for any increase in prices.

A word also to Slogger and ACP, please increase the size of your respective stands. If interest in your products in support of the Electron continues, as there is no doubt that it will, at future shows your stands will be trampled under the crush.

I attempted on two occasions to get near the ACP stand, and after half an hour in the crush, gave up the attempt.

Micronet 800 were as unhelpful as ever. At the Autumn 85 show, I was assured by this stand that material for the Electron would quickly become available on Micronet 800 with the launch of the Pace Nightingale/Commstar package. Taking

their word, I quickly bought this communications package, and over six months later I am still waiting for one single frame on the whole of Prestel/Micronet which supports the Elk.

I am continually told that Electobeeb, page 800931 is the answer to my problems, but all this does is increase my frustrations for it appears to be entirely dedicated to the BBC Micro and should more honestly be recalled Beespot.

Micronet really should get their act together and provide the service which their sales patter offers. After all, we Electron owners pay the same subscription as all the other PC users who are most adequately catered for.

In the defence of Micronet, I was advised by the staff at the stand that they have very few Electron users on the system, so maybe the solution lies in our own hands, to apply pressure until we get a response.

Slogger and Pace have

problems with compatibility between the Plus 1 upgrade ROM and Commstar ROM.

With the Plus 1 upgrade chip fitted, and calling Commstar, the Electron locks up.

A telephone call to Slogger after the show was as helpful as ever. "Yes there was a problem, and yes we are looking into it, and yes, we will be in touch when it is solved".

Great after sales service – well done Slogger once more.

Shouting across the crush to the ACP stand, I was assured that the ACP 5 will be on the market shortly. This is the item all serious Electron users have been waiting for.

So another show is over and I am even more convinced that the Electron as a little acorn is steadily growing into a mighty oak.

Keep up the good work chaps. Keep producing the goods and we will continue to part with our money – if we can get near the stands that is! – Trevor Dunkerley, Reading, Berks.

such variable at line 100? – D.W. Daglish, Drumchapel, Glasgow.

• The listing is correct. In fact this is the first letter we've had concerning Invasion Force.

If you've checked line 100 several times then it probably is correct and you aren't going blind at all.

'No such variable' is a peculiar error report in that often the error is elsewhere in the program and not in the line at which the Electron stops. Please check the whole listing carefully.

## Connection quandary

I AM almost about to order an Electron Plus 1, but have one doubt. If I buy the Plus 1 is it a simple matter of connecting up a compatible printer by

plugging it in, or is some other device necessary before it can perform?

The printer in question is an Epson. – G.T. Jackson, Liverpool.

• The only additional piece of equipment you'll need to use a printer is a cable with the appropriate connectors at either end. You should be able to buy one with your printer.

## OLD remedy for recovery

I HAVE a query concerning the soft and hard break facility on the Electron.

Everything I've read says that a hard break has the same effect as turning the computer off and then on again, completely resetting it.

I have noticed recently,

however, that I have been able to recall programs using OLD after doing a hard break. Is it normal to be able to do this? – Paul Williams, Weston Super Mare.

• A hard break isn't quite the same as turning the Electron off then back on. If you enter:

\*FX200,0

it will be possible to recover the program using OLD. If, however, you enter:

\*FX200,2

you will not be able to recover the program since the Electron will clear all the memory from &400 upwards.

## Wrong type of answer

I RECENTLY bought an Acorn Electron and am capable of

writing a few simple programs, but I have hit a snag with programs using INPUT, for instance:

```
10 REM Program
20 PRINT "Are you old?"
30 INPUT answer
```

Now how do you get the computer to print two different statements, depending on whether the INPUT answer is "yes" or "no"? – James Baker, Scole, Norfolk.

• What you are inputting here is a number when you really want a string. Change answer to answer\$ and add these lines:

```
40 IF answer$="YES" THEN
PRINT "I don't mind."
50 IF answer$="NO" THEN
PRINT "Ok."
```

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**MISSILE JAMMER** Defend the city of Pezina from a missile invasion. **VECTOR LETTERS** Use \*LINE to create double height text. **DEGREES** Convert from Centigrade to Fahrenheit and vice-versa. **CROCODILE TEARS** Spell well or end up as a crocodile's dinner. **ZAP** Blast the marauding aliens. **EXTRA COMMANDS** Adding new keywords to Basic.

**On the April 1986 tape:**  
**INVASION FORCE** Exciting zap 'em space game. **EASTER EGG HUNT** Seasonal game using compass points. **BACH TO BASICS** Music tutor. **NOTICE BOARD** Text scrolling utility. **SEARCH** and **RECOVER**. Two routines from the disc article. **NOTEBOOK** Recursion backwards.

**On the March 1986 tape:**  
**GRAND PRIX** Exciting race game. **DICER** A clever test of strategy. **MARCHING ORDER** Counting and ordering numbers. **FIND AND REPLACE** Useful editing program. **SECTOR EDITOR** Excellent disc utility. **TIMEPIECE** Superb graphics demonstration. **OXO** Game of cunning. **TRICIRC** A circle of triangles.

**On the February 1986 tape:**  
**NECROMANCER** Superb text adventure. **GREBIT** Arcade action. **FAST BACKUP** Disc utility.

**MACHINE CODE** How to write an arcade game. **TAPEDISC** More software transferring techniques. **SIDEWAYS RAM** Example program.

**On the January 1986 tape:**  
**FRUIT WORM** An arcade classic. **HELICOPTER RESCUE** Pilot an air sea-rescue helicopter. **MACHINE CODE** Detect collisions between sprites. **TAPEDISC** Transfer your software to disc. **MODE012** Multi-Mode screens.

**On the December 1985 tape:**  
**GET SET SANTA** Christmas fun collecting presents. **MISSILE ATTACK** Save your cities! **PROGRAM PROBE** Using joysticks. **SPACE COUNT** Counting for youngsters. **CHRISTMAS CARD** Cards and carrots for all. **DISC MENU** Disc Menu creator.

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**On the April 1985 tape:**  
**SUPER ARCHER** Target practice. **BINARY SEARCH** Search data efficiently. **JOYPLUS** Switched joystick routine. **ODD ONE OUT** Educational fun. **POLYGONS** 3D rotation. **MONEY CRAZY** Arcade action. **STARCHART** The night sky. **FORTUNE TELLER** Horoscope. **COLLISION DETECTION** Alien encounters. **HILO** Guessing game. **NOTEBOOK** Hello to assembler.

**On the March 1985 tape:**  
**MR. FREEZE** Ice cube arcade action. **SCREENDUMP** Two procedures for printer dumps. **FILLER** The machine code fill rouging. **FRED'S WORD GAME** Educational fun. **BIG LETTERS** Large text utility. **PERCY** Beat the burning fuse. **ANIMATION** Two example programs. **PIGS** Flying bacon. **NOTEBOOK** Display formatting.

**On the February 1985 tape:**  
**CRAAL** The mystifying maze adventure. **BOUNCY** Addictively annoying action. **PAIRS** Can you remember the cards? **BASE A** Binary/hexadecimal conversion utility. **CATCHER** Collect the eggs before they break. **CLOCK** Time-keeping utility. **RACER** Grand Prix action. **NOTEBOOK** Graphics windows. **TRIG** All the right angles.

**On the January 1985 tape:**  
**SPACE BATTLE** Destroy the deadly depending aliens! **NEW YEAR** A sound and graphics greeting. **ESCAPE FROM SCARGOV** Minefield action. **PIE CHART** Statistics made simple. **CLAYPIGEON** An Electron birdshot. **ORGAN** Music maestro please! **NOTEBOOK** An original program. **RANDOM NUMBERS** Or not so random! **SNAKES** Reptilian arcade action. **CHEESE RACE** Snail rivel mice.

**On the December 1984 tape:**  
**CHRISTMAS BOX** Align the presents logically. **SILLY SANTA** Sort out the muddle. **SNAP** Match the Xmas pictures. **RECOVERY** The Bad Program message tamed. **CAROL** Interrupt driven music. **AUTODATA** A program that grows and grows. **NOTEBOOK** Simple string handling.

**On the November 1984 tape:**  
**STAR FIGHTER** Anti-alien missions. **SCROLLER** Wrap around machine code. **URBAN SPRAWL** Environmental action game. **SPELL** Alphabetic education. **JUMPER** Level headed action. **CAESAR** Code breaking broken. **KEYBOARD** Typing game.

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Palindromes and string handling.

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**On the August 1984 tape:**  
**SANDCASTLE** The Electron seaside outing. **KNOCKOUT** Bouncing balls batter brick walls. **PARACHUTE** Keep the skydivers dry. **LETTERS** Large letters for your screen. **SUPER-SPELL** Test your spelling. **ON YOUR BIKE** Pedal power comes to your Electron. **SCROLLER** Sliced strings slide sideways.

**On the July 1984 tape:**  
**GOLF** A day on the links with your Electron. **SOLITAIRE** The classic solo logic game. **TALL LETTERS** Large characters made simple. **BANK ACCOUNT** Keep track of your money. **CHARTIST** 3D graphs. **FORMULAE** Areas, volumes and angles.

**On the June 1984 tape:**  
**MONEY MAZE** Avoid the ghosts to get the cash. **CODE BREAKER** A mastermind is needed to crack the code. **ALIEN** See little green men the Electron way! **SETUP** Colour commands without tears. **CRYSTALS** Beautiful graphics. **LASER SHOOT OUT** An intergalactic shooting gallery. **SMILER** Have a nice day!

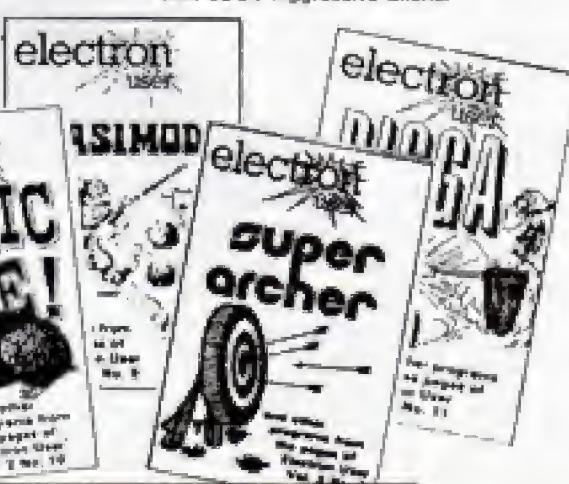
**On the May 1984 tape:**  
**RALLY DRIVER** High speed car control. **SPACE PODS** More aliens to annihilate. **CODER** Secret messages made simple. **FRUIT MACHINE** Spin the wheels to win. **CHASER** Avoid your opponent to survive. **TIC-TAC-TOE** Electron noughts and crosses. **ELECTRON DRAUGHTSMAN** Create and save Electron masterpieces.

**On the April 1984 tape:**  
**SPACEHIKE** A hopping arcade classic. **FRIEZE** Electron wallpaper. **PELICAN** Cross roads safely. **CHESSTIMER** Clock your moves. **ASTEROID** Space is a minefield. **LIMERICK** Automatic rhymes. **ROMAN** Numbers in the ancient way. **BUNNYBLITZ** The Easter programme. **DOGGUCK** The classic logic game.

**On the March 1984 tape:**  
**CHICKEN** Test your nerve. **COFFEE** A tantalising word game. **PARKY'S PERIL** Parky's invisible maze. **REACTION TIMER** How fast are you? **BRAINTEASER** A puzzling program. **COUNTER** Mental arithmetic. **PAPER, SCISSORS, STONE** Out-guess your Electron. **CHARACTER GENERATOR** Create shapes.

**On the February 1984 tape:**  
**NUMBER BALANCE** Mental arithmetic. **CALCULATOR** Make your Electron a calculator. **DOILIES** Patterns galore. **TOWERS OF HANOI** The age old puzzle. **LUNAR LANDER** Test your skill. **POSITION INVADERS** The old arcade favourite.

**On the introductory tape:**  
**ANAGRAM** Sort out the jumbled letters. **DOODLE** Multicoloured graphics. **EUROMAP** Test your geography. **KALEIDOSCOPE** Electron graphics fun riot. **CAPITALS** New upper case letters. **ROCKET, WHEEL, CANDLE** Three fireworks programs. **BOMBER** Drop the bombs before you crash. **DUCK** Simple animation. **METEORS** Collisions in space.



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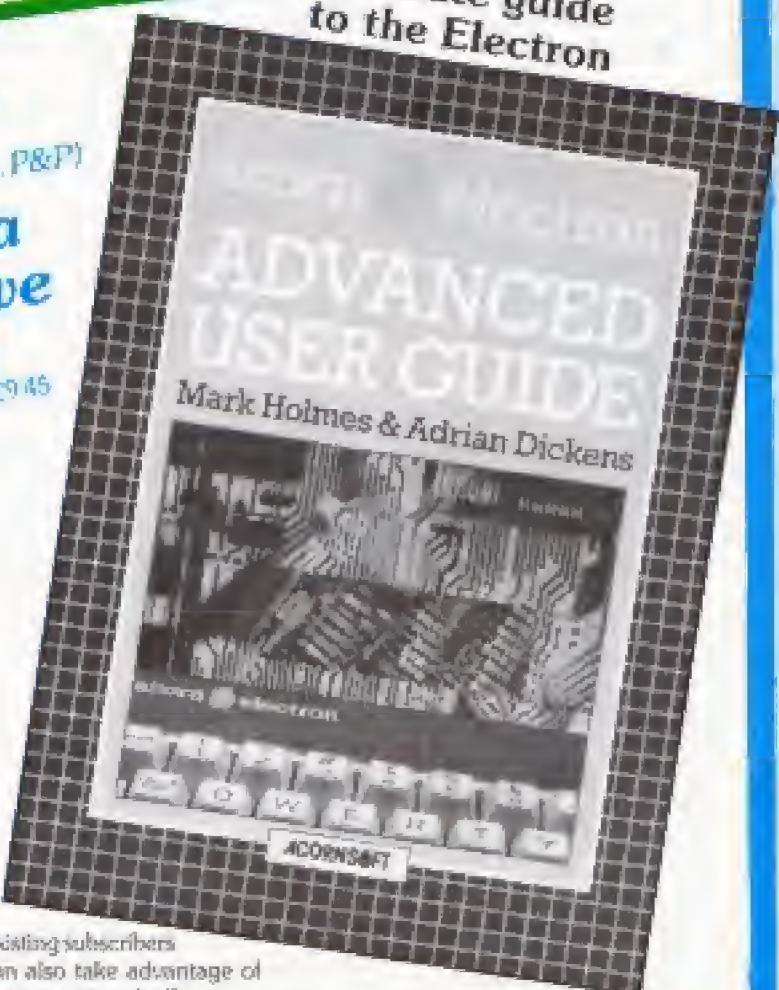
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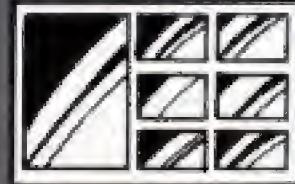
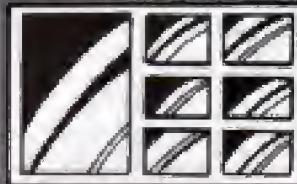
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# LOOKING INTO TEXT WINDOWS



BY NOW you should be drawing coloured lines all over the place. All you need are the GCOL, MOVE and DRAW commands and some numbers for them to work on.

Put the Electron into Mode 1 with:

**MODE 1**

and then select the colour red with:

**GCOL 0,1**

The mode change will have moved the graphics cursor to the bottom left of the screen – the point with coordinates 0,0. Next draw a line across the display with:

**DRAW 1279,1023**

Now take a look at the screen. Unless you've done some mistyping or added a few commands you should have a screen with the last two commands – the GCOL and DRAW – at the top left. Also there's our red line, which is the result of these commands.

Notice that our GCOL command didn't affect the colour of the text, which is still white. If we wanted red text we'd have to use:

**COLOUR 1**

to do it.

Another thing to notice is that the graphics cursor and the text cursor are completely different things. The text cursor is the annoying flashing white line.

At the moment – unless you've altered or added to the above commands – this is three lines down the screen, by the prompt. It shows where the next bit of text is going to be printed.

Meanwhile the graphics cursor is at the top right of the screen, point 1279,1023. Our DRAW moved it there from its original position at the bottom left, leaving a red line trailing behind it.

From all this you should see that the Electron treats text and graphics displays very differently. In fact it looks on



Figure I: Mode 1 text screen

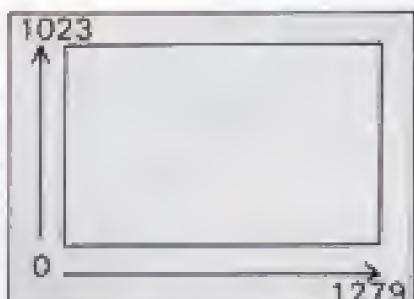


Figure II: Graphics screen

them as two completely different screens, one for text and one for graphics.

They just happen to coincide at the start of things. With the micro in Mode 1, Figures I and II show the Electron's slightly schizoid view of the screen.

However it's not just the Electron which looks at the screen in two ways at once. When we want to print something at a particular point on the text screen we use PRINT and TAB looking on the screen as it's described by Figure I.

It's usually one of the first things learnt in Basic. If we need coloured text then COLOUR is brought into play.

Yet if we want coloured lines we use DRAW and GCOL along with the coordinate system shown in Figure II.

Let's face it, we've got the same divergent ways of looking at the screen as the Electron.

As I've said, at switch-on or after mode changes the text screen and the graphics screen cover the same area, the whole of the display.

However, it doesn't have to be like this. We can define a text window as a rectangular area of the screen in which all the things we PRINT and TAB are made to appear.

In effect the text screen that originally occupied all the display is reduced in size to take up only part of it. The command for creating a text window is:

**VDU 28,bottomx,bottomy,  
topx,topy**

The VDU bit tells the Electron that it's one of the commands that refer to the Visual Display Unit – the telly or monitor. The 28 indicates which particular action to take – in this case to create a text window.

The four figures that follow are the coordinates of the bottom left and top right corners of the text window. These are measured in character spaces and lines from the

top left corner of the screen, just like TAB.

Figure III shows how the coordinates are related to the text window. Be warned – the punctuation used in VDU commands is vital. Get it right or weird things can happen.

Let's see a text window in practice. Clear the screen and enter:

**VDU 28,4,38,28,4**

You now have a text window, even though nothing appears to have happened. However if you look closely you'll see that the prompt, > is inset. It's at the start of the text window.

Now hold down a key, say

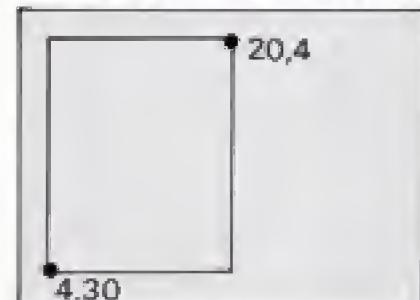


Figure IV: Our first text window

the N key, and see what happens. Instead of the line of Ns going right across the screen as normal they only get so far and then start again on the line below. They're trapped inside the text window.

Figure IV shows the text window and the coordinates that define it.

As soon as you've had enough of the Ns try entering CLS to clear the screen and see what happens. All the Ns – or whatever you used – disappear, but notice that the original:

**VDU 28,4,38,28,4**

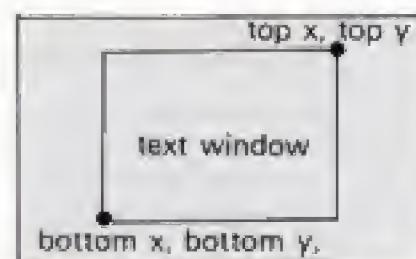


Figure III: Text windows – the coordinates used

is still sitting up there at the top. Why hasn't CLS wiped it?

The answer is that CLS only works on the text screen and we've just limited that to a bit of the screen starting 5 lines down from the top. The previous command is still stranded on the first line.

Now this top line is still part of the graphics screen which covers the whole screen area until we issue the appropriate VDU command.

So if there's a keyword corresponding to the text screen's CLS that clears the graphics screen it should get rid of the stranded VDU28 for us.

Such a command is CLG. Try it and you'll be left with a nice blank screen. Not for long though. Let's draw a line across it with:

DRAW 1279,1023

No doubt we'd get a fortune for it at the Tate. However before you enter the tricky world of conceptualist art notice one thing about the line: It crosses the text window quite happily.

The text window is still there - we've only wiped it, not destroyed it. You'll see this is where we use CLS again.

Now the text screen is cleared and with it goes part of the white line, leaving it split in two. So clearing a text screen

```

10 REM Program I
20 MODE 1
30 VDU 23,1,0;0;0;
40 xleft=1:yleft=30
50 xright=39:yright=1
60 FOR loop=1 TO 7
70 xleft=xleft+2:yleft=y
left-2
80 xright=xright-2:yright
t=yright+2
90 VDU 28,xleft,yleft,xr
ight,yright
100 COLOUR 128+loop MOD 4
110 CLS
120 NEXT loop

```

Program I

also gets rid of any graphics that cross it.

The text window is a bit of an elusive beast, isn't it? I mean we can't really see it, can we? This is because its background colour, black, is the same as the graphics screen's background colour. Let's change this with:

COLOUR 129

when a quick CLS will produce a nice red rectangle on screen. That's our text window. We can change the background colour of our graphics window, but this time we have to use GCOL.

It's used in exactly the same way as the COLOUR command with 128 added to the relevant logical colour number. So for a yellow graphics screen background we want GCOL along with 128+2. Try entering:

GCOL 8,130

which appears in the text window - and then clearing the graphics screen with CLG. The result is an almost completely yellow screen.

Notice that now the graphics screen has its revenge, totally swallowing the red of the text screen. All that's left is a forlorn white prompt on a red background at the top of the text screen area.

Give it some encouragement with a quick CLS which will cause the text area to reappear. You'll also see how much faster CLS is compared with CLG.

Try making your own text windows. Don't worry - if you make a mess of things you can always press Break. The more gentle among you may like to know that VDU 26 undoes the effect of VDU 28, setting things back to normal with the text and graphics screens filling the whole display.

Once you've got the hang of how to create text windows and the difference between them and the graphics screen have a look at Program I.

It produces a pattern by creating a text window and

clearing it, defining another window lying wholly inside the first and clearing that one to a different background colour and so on.

Line 30 switches off the flashing cursor while lines 40 and 50 initialise the variables that are used to define successive windows.

The FOR...NEXT loop of lines 60 to 120 cycles seven times. Each time through, lines 70 and 80 calculate new values for the coordinates which are then used in line 90 to create a new text window. Line 100 picks a fresh background colour after which 110 clears it.

Text windows aren't limited to just making pretty patterns. They can help make displays easier to understand and add a professional touch. Program II shows a text window being used for a message while the rest of the screen is used for graphics.

The text window is set up at line 40. The program then enters an endless REPEAT...UNTIL loop. Nested inside this is a FOR...NEXT loop which cycles 50 times, drawing a multicoloured star in the process.

When this is done lines 110 and 120 use PRINT to send a message to the screen. This appears neatly in the text

```

10 REM Program II
20 MODE 1
30 VDU 23,1,0;0;0;
40 VDU 28,12,30,28,26
50 REPEAT
60 FOR loop=1 TO 50
70 MOVE 640,612
80 GCOL 8, RND(3)
90 DRAW 640+(-1^RND(2))+R
ND(300),612+(-1^RND(2))+RN
D(300)
100 NEXT loop
110 PRINT "Press spacebar"
120 PRINT "for another go"
130 wait=GET
140 CLS
150 UNTIL FALSE

```

Program II

window under the display. Try moving the window to another area of the screen and see what happens.

You'll find that line 40 is the only one that needs altering. The program now waits until a key is pressed, then clears the text window and carries on. Add:

145 CLB

and see what happens. Do you need line 140 now?

As you've played around with text windows you've probably noticed that they are a great way of producing coloured rectangles on screen. Program III makes use of this to produce five randomly positioned blocks of colour.

The mechanics of the pro-

```

10 REM Program III
20 ONERROR GOTO 130
30 MODE 1
40 VDU 23,1,0;0;0;
50 FOR loop=1 TO 5
60 COLOUR 128+RND(3)
70 leftx=RND(38)
80 topy=RND(38)
90 VDU 28,leftx,topy+8,1
#ftx+8,topy
100 CLS
110 NEXT loop
120 REPEAT UNTIL FALSE
130 COLOUR 3:COLOUR 128:V
DU 26:CLS

```

gram should be fairly straightforward by now. All line 20 does is make sure that when you press Escape to stop the program the screen reverts to normal. It's much subtler than hammering the Break key, isn't it?

One thing about Program III is that the loop cycles five times, but you don't always see five rectangles. Can you explain why? And can you solve the problem?

● By the time you've done that you'll really understand text windows and be ready for next month when we'll look into some more windows.

## Maze listing

### From Page 31

10 REM Maze  
 20 REM By S.Merrigan  
 30 REM (c) Electron User  
 40 ONERRORMODE6:REPORT:P  
 RINT" at line ";ERL:END  
 50 IFPAGE>4ERB PROCdload  
 :END  
 60 MODE4:PROCins:CLS  
 70 REPEAT  
 80 ?keyco=1:keyco?1=0?:?  
 eave=0:mazey2=0?:map=0:sc1=  
 0:1:i=3:?&B6=6:?:&7=5  
 90 PROCvar:PROCread:PROC  
 key:PROCre\_spr1  
 100 REPEAT:MODE5  
 110 VDU19,0,4,0;  
 120 VDU23,1,0,0,0,0;  
 130 PROCdraw:PROCre\_spr:C  
 ALLmaze  
 140 CALLstart  
 150 IF?dead=2 MODE4:PROCd  
 reap  
 160 IF?dead=3 PROClevel:P  
 ROCvar:PROCread:PROCkey:key  
 co?1=0?:?eave=0?:?map=0  
 170 IF?dead=1 PROClive:PR  
 OCvar  
 180 UNTIL1:i=0  
 190 sc2=sc1+(keyco?1+10)  
 200 VDU20:CLS:IF sc2>HII(5)  
 5) PROChi  
 210 PROChi\_sc  
 220 UNTILFALSE  
 230 DEFPROCassembly  
 240 FORI=BT02STEP2  
 250 PI=Q1  
 260 (OPTI  
 270 .start  
 280 LDA&71:STAaa  
 290 .start1  
 300 JSRmove  
 310 LDA&86:STAcou:JSRsave  
 320 LDAdead:BEQstart2:RTS  
 330 .start2  
 340 DECaa  
 350 BPLstart1  
 360 LDIX#so3 MOD256:LDY#so  
 3 DIV256:LDA#71:JSR&FFF1  
 370 JSRenemy  
 380 JMPstart  
 390 .save  
 400 LDA#2:LDI#time MOD256  
 :LDY#time DIV256:JSR&FFF1  
 410 .savel  
 420 LDA#1:LDI#time1 MOD25  
 6:LDY#time1 DIV256:JSR&FFF1

430 LDAcou:CMPTime1:BPLsa  
 vel  
 440 RTS  
 450 .aa EQU#0:.cou EQU#0  
 460 .leave EQU#0  
 470 .dead EQU#0  
 480 .counter EQU#0:EQU#0  
 490 .keyco EQU#0  
 500 .map EQU#0  
 510 .time EQU#0:EQU#0:EQU  
 #0  
 520 .timel EQU#0:EQU#0:EQU  
 #0  
 530 .so EQU#1:EQU#1:EQU#2  
 #1:EQU#1#0  
 540 .sol EQU#1:EQU#2:EQU#  
 1#0:EQU#1#0  
 550 .so2 EQU#1:EQU#3:EQU#  
 1#0:EQU#2#0  
 560 .so3 EQU#1:EQU#2:EQU#  
 1#0:EQU#1#0  
 570 .maz3  
 580 CMP#0:BERenup1:JMPene  
 my2  
 590 .enup1  
 600 LDA#0:STA(enemypos),Y  
 610 LDA&70:STA(enemypos)  
 620 LDA&71:STA(enemypos)+1  
 630 LDA&2:STA(enemypos),Y  
 640 DECyenemy:JMPenemy2  
 650 .enup  
 660 LDAenemypos:STA&70  
 670 LDAenemypost1:STA&71  
 680 LDA&70:SEC:SBC#1:STA  
 &70  
 690 LDA&71:SBC#0:STA&71  
 700 LDY#0:LDA(&70),Y  
 710 CMP#2:BNEmy3:LDA#1:#  
 TAdead:JMPenleft1  
 720 .endown  
 730 LDAenemypos:STA&70  
 740 LDAenemypost1:STA&71  
 750 LDA&70:CLC:ADC#21:STA  
 &70  
 760 LDA&71:ADC#0:STA&71  
 770 LDY#0:LDA(&70),Y  
 780 CMP#2:BNEmy4:LDA#1:#  
 TAdead:JMPendown1  
 790 .maz4  
 800 CMP#0:BEQendown1:JMPe  
 neay2  
 810 .endown1  
 820 LDA#0:STA(enemypos),Y  
 830 LDA&70:STA(enemypos)  
 840 LDA&71:STA(enemypos)+1  
 850 LDA#2:STA(enemypos),Y  
 860 INCyenemy:JMPenemy2  
 870 .enemy  
 880 LDAxman:CMPxenemy  
 890 BEQenemy1  
 900 BMienleft  
 910 BPLenright  
 920 .enemy1  
 930 LDAyaan:CMPyenemy  
 940 BEQenemy2  
 950 BMienup  
 960 BPLendown  
 970 .enemy2  
 980 LDAxenemy:CMPxtuple:#  
 PLene1:RTS  
 990 .ene1  
 1000 LDAyenemy:CMPytuple:#  
 PLene2:RTS  
 1010 .ene2  
 1020 LDAxbotri:CMPxenemy:#  
 PLene3:RTS  
 1030 .ene3  
 1040 LDAybtris:CMPyenemy:#  
 PLene4:RTS  
 1050 .ene4  
 1060 LDIX#so2 MOD256:LDY#so  
 2 DIV256:LDA#71:JSR&FFF1  
 1070 JSRduoff:JSRReset:JM  
 Paaze  
 1080 .enleft  
 1090 LDAenemypos:STA&70  
 1100 LDAenemypos+1:STA&71  
 1110 LDA&70:SEC:SBC#1:STA  
 &70  
 1120 LDA&71:SBC#0:STA&71  
 1130 LDY#0:LDA(&70),Y  
 1140 CMP#2:BNEmy1:LDA#1:#  
 TAdead:JMPenleft1  
 1150 .maz1  
 1160 CMP#0:BEQenleft1:JMPe  
 neay1  
 1170 .enleft1  
 1180 LDA#0:STA(enemypos),Y  
 1190 LDA&70:STA(enemypos)  
 1200 LDA&71:STA(enemypost1)  
 1210 LDA#2:STA(enemypos),Y  
 1220 DECxenemy:JMPenemy1  
 1230 .enright  
 1240 LDAenemypos:STA&70  
 1250 LDAenemypost1:STA&71  
 1260 LDA&70:CLC:ADC#1:STA  
 &70  
 1270 LDA&71:ADC#0:STA&71  
 1280 LDY#0:LDA(&70),Y  
 1290 CMP#2:BNEmy2:LDA#1:#  
 TAdead:JMPenright1  
 1300 .maz2  
 1310 CMP#0:BEQenright1:JMP  
 enemy1  
 1320 .enright1  
 1330 LDA#0:STA(enemypos),Y  
 1340 LDA&70:STA(enemypos)  
 1350 LDA&71:STA(enemypost1)  
 1360 LDA#2:STA(enemypos),Y  
 1370 INCxenemy:JMPenemy1  
 1380 .box  
 1390 JSRone  
 1400 JSRsecond:JSRthird  
 1410 JSRsecond:JSRthird  
 1420 JSRsecond:JSRthird  
 1430 JSRsecond:JMPforth  
 1440 .second  
 1450 LDA&70:CLC:ADC#40:ST  
 A&70  
 1460 LDA&71:ADC#1:STA&71  
 1470 LDY#31:LDA#240  
 1480 .second1  
 1490 STA(&70),Y  
 1500 DEY:BPLsecond1  
 1510 RTS  
 1520 .third  
 1530 LDA#15:LDY#47  
 1540 .second2  
 1550 STA(&70),Y  
 1560 DEY:CPY#31  
 1570 BNEsecond2  
 1580 RTS  
 1590 .forth  
 1600 LDY#47:LDX#15  
 1610 .forth1  
 1620 LDA&C80,I  
 1630 STA(&70),Y  
 1640 DEY:DEX  
 1650 BPLforth1  
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 1670 .one  
 1680 LDY#15  
 1690 .onea  
 1700 LDA&C20,Y  
 1710 ORA(&70),Y  
 1720 STA(&70),Y  
 1730 DEY:BPLonea  
 1740 LDA#255:LDY#31:LDX#15  
 1750 .one1  
 1760 STA(&70),Y  
 1770 DEY:DEX  
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 1790 LDIX#15:LDY#47  
 1800 .one2  
 1810 LDA&C10,I  
 1820 STA(&70),Y  
 1830 DEY:DEX  
 1840 BPLone2  
 1850 RTS  
 1860 .erase  
 1870 LDA&BF:STA&72  
 1880 LDA#64:STA&73  
 1890 LDA#0:LDY#144  
 1900 LDIX#6

1910 .eraser  
 1920 STA(&72),Y  
 1930 DEY  
 1940 BNEeraser  
 1950 LDA&72:CLC:ADC#40:STA  
 &72  
 1960 LDA&73:ADC#1:STA&73  
 1970 LDY#144:LDA#0  
 1980 DEI:BPLeraser  
 1990 RTS  
 2000 .man  
 2010 LDA#430:STA&72  
 2020 LDA#80C:STA&73  
 2030 LDY#4:LDY#31  
 2040 .man1  
 2050 LDA(&72),Y  
 2060 EOR(&70),Y  
 2070 STA(&70),Y  
 2080 DEY:BPLman1  
 2090 LDA&72:CLC:ADC#32:STA  
 &72  
 2100 LDA&70:CLC:ADC#40:STA  
 &70  
 2110 LDA&71:ADC#1:STA&71  
 2120 LDY#31:DEI:BPLman1  
 2130 RTS  
 2140 ,keyhole  
 2150 LDX#2:LDA#0:STA&72  
 2160 LDA#80C:STA&73  
 2170 .key1  
 2180 LDY#15  
 2190 LDA&70:CLC:ADC#40:STA  
 &70  
 2200 LDA&71:ADC#1:STA&71  
 2210 .key2  
 2220 LDA(&72),Y  
 2230 EOR(&70),Y  
 2240 STA(&70),Y  
 2250 DEY:BPLkey2  
 2260 LDA&72:CLC:ADC#16:STA  
 &72  
 2270 DEI:BPLkey1  
 2280 RTS  
 2290 .key LDX#2:LDA#14:STA  
 &72  
 2300 LDA#809:STA&73  
 2310 .keys LDY#31  
 2320 .keys1  
 2330 LDA(&72),Y  
 2340 EOR(&70),Y  
 2350 STA(&70),Y:DEY:BPLkey  
 s1  
 2360 LDA&72:CLC:ADC#32:STA  
 &72  
 2370 LDA&70:ADC#40:STA&70  
 2380 LDA&71:ADC#1:STA&71  
 2390 DEI:BPLkeys:RTS  
 2400 .move LDA#1:STA&84

## Maze Man



**Score** - 0  
**Keys** - 0 : 2  
**Lives** - 3

**MAP**

2410 LDA#129:LDY#FF:LDX#& 9E:JSR&FFF4:CPY#0:BEQmove2: JMPleft	aps0:JMPleft1 2550 .go CMP#3:BEQgot:JMPa ove3	2730 .got CMP#3:BEQgot2:RT S
2420 .move2 LDA#129:LDY#FF F:LDX#&B0:JSR&FFF4:CPY#0:BE Qmove3:JSRright	2560 .got JSRkey:LDY#0 2570 .left1 INC#84 2580 DECxman:DECxtople:DEC xbotri	2740 .got2 JSRkey:LDY#0 2750 .right1 INC#84 2760 INCxman:INCxtople:INC xbotri
2430 .move3 LDA#129:LDY#FF F:LDX#&B7:JSR&FFF4:CPY#0:BE Qmove4:JMPup	2590 LDA#0:STA(mnpos),Y 2600 LDAmanpos:SEC:SBC#1:S TAmnpos	2770 LDA#0:STA(mnpos),Y 2780 LDAmanpost:CLC:ADC#1:S TAmnpos
2440 .move4 LDA#129:LDY#FF F:LDX#&97:JSR&FFF4:CPY#0:BE Qmove5:JSRdown	2610 LDAmanpos+1:SBC#0:STA manpos+1	2790 LDAmanpos+1:ADC#0:STA manpos+1
2450 .move5 LDAmap:CMPI#1:0 NEmove6:LDA#129:LDY#FF:LDX #49D:JSR&FFF4:CPY#0:BEQmove 6:LDA#2:STAdead	2620 LDApointer:SEC:SBC#1: STApointer	2800 LDApointer:CLC:ADC#1: STApointer
2460 .move6 DEC#94:BEQmove 7:RTS	2630 LDApointer+1:SBC#0:ST Apointer+1	2810 LDApointer+1:ADC#0:ST Apointer+1
2470 .move7 LDA#6:STAou:J MPsave	2640 LDA#2:STA(mnpos),Y 2650 JSRvduoff:JSRerase:JS Rmaze:JMPmove3	2820 LDA#2:STA(mnpos),Y 2830 JSRvduoff:JSRerase:JS Rmaze
2480 .left LDAmanpos:STA&7 0	2660 .right LDAmanpos:STA& 70	2840 .up LDAmanpos:STA&70 2850 LDAmanpost1:STA&71
2490 LDAmanpos+1:STA&71 2500 LDA&70:SEC:SBC#1:STA& 78	2670 LDAmanpost1:STA&71 2680 LDA&70:CLC:ADC#1:STA& 78	2860 LDA&71:SBC#0:STA&71 2880 LDY#0:LDA(&70),Y
2510 LDA&71:SBC#0:STA&71 2520 LDY#0:LDA(&70),Y	2690 LDA&71:ADC#0:STA&71 2700 LDY#0:LDA(&70),Y	2890 BEQup1
2530 BEQleft1:CMPI#5:BNEned :LDAleave:CMPI#1:BNEned:LDA 3:STAdead:JMPleft1	2710 BEQright1:CMPI#5:BNEne d1:LDAleave:CMPI#1:BNEned1:L DA#3:STAdead:JMPright1 2720 .ned1 CMPI#4:BNEgo1:JS Rmapso:JMPright1	2900 CMPI#5:BNEned2:LDA#3:STA dead:JMPup1
2540 .ned CMPI#4:BNEgo1:JSRa		2910 .ned2 CMPI#4:BNEgo2:JS

## Maze listing

### From Page 57

Reaps:JMPup1  
 2920 .go2 CMP#3:BEGot3:JM  
 Peove5  
 2930 .got3 JSRkey:LDY#0  
 2940 .up1 INC#84  
 2950 DECyman:DECytople:DEC  
 ybotri  
 2960 LDA#0:STA(manpos),Y  
 2970 LDAmmanpos:SEC:SB#21:  
 STAmanpos  
 2980 LDAmmanpos+1:SB#0:STA  
 manpos+1  
 2990 LDApinter:SEC:SB#21  
 :STApointer  
 3000 LDApinter+1:SB#0:ST  
 Apointer+1  
 3010 LDAm2:STA(manpos),Y  
 3020 JSRvduoff:JSRerase:JS  
 Reaze:JMPmove5  
 3030 .down LDAmmanpos:STA#7  
 0  
 3040 LDAmmanpos+1:STA#71  
 3050 LDA#70:CLC:ADC#21:STA  
 #70  
 3060 LDA#71:ADC#8:STA#71  
 3070 LDY#0:LDA#70),Y  
 3080 BEQdown1  
 3090 CMP#5:BNEned3:LDAleav  
 e:CMP#1:BNEned3:LDA#3:STAde  
 ad:JMPdown1  
 3100 .ned3 CMP#4:BNEgo3:JS  
 Reaps:JMPdown1  
 3110 .go3 CMP#3:BEGot4:R  
 TS  
 3120 .got4 JSRkey:LDY#0  
 3130 .down1 INC#84  
 3140 INCyman:INCytople:INC  
 ybotri  
 3150 LDA#0:STA(manpos),Y  
 3160 LDAmmanpos:CLC:ADC#21:  
 STAmanpos  
 3170 LDAmmanpos+1:ADC#8:STA  
 manpos+1  
 3180 LDApinter:CLC:ADC#21  
 :STApointer  
 3190 LDApinter+1:ADC#8:ST  
 Apointer+1  
 3200 LDA#2:STA(manpos),Y  
 3210 JSRvduoff:JSRerase:JM  
 Peaze  
 3220 .maze LDApinter:STA#  
 78  
 3230 LDApinter+1:STA#79  
 3240 LDA#2:STAcounter  
 3250 LDA#8:STAcounter+1  
 3260 LDA#6:STAcounter+2

3270 .maze4 LDA#1:STAcount  
 er+3:JSRmazel  
 3280 LDA#78:CLC:ADC#21:STA  
 #78  
 3290 LDA#79:ADC#0:STA#79  
 3300 DECcounter:BPLmaze4:L  
 DY#3  
 3310 .vduron LDA#19:JSRo  
 3320 TYA:JSRo:JSRo  
 3330 LDA#0:JSRo:JSRo:JSRo  
 3340 DEY:BNEvduron  
 3350 JMPline  
 3360 .maze1 LDYcounter+3:L  
 DA#78),Y  
 3370 BEQmazel  
 3380 LDYcounter+1  
 3390 LDX#980,Y:STX#70  
 3400 LDX#981,Y:STX#71  
 3410 CMP#1:BNEmaze3:JSRbox  
 :JMPmazel  
 3420 .maze3 CMP#2:BNEmaze2  
 :JSRman:JMPmazel  
 3430 .maze2 CMP#3:BNEmazc:J  
 SRkey:JMPmazel  
 3440 .maz CMP#4:BNEmazet:J  
 SRdr\_map:JMPmazel  
 3450 .mazie CMP#5:BNEmazel  
 :JSRkeyhole  
 3460 .mazel INCcounter+3  
 3470 INCcounter+1:INCcount  
 er+1  
 3480 LDACounter+1:CMPCount  
 er+2  
 3490 BNEmazel  
 3500 LDACounter+2:CLC:ADC  
 #6:STAcounter+2  
 3510 RTS  
 3520 .vdutoff LDY#3  
 3530 .vdutoff1 LDA#19:JSRo  
 3540 TYA:JSRo  
 3550 LDA#4:JSRo  
 3560 LDA#0:JSRo:JSRo:JSRo  
 3570 DEY:BNEvdutoff1:RTS  
 3580 .line LDA#25:JSRo:LDA  
 #4:JSRo  
 3590 LDA#248:JSRo:LDA#0:JS  
 Ro  
 3600 LDA#96:JSRo:LDA#2:JSR  
 0  
 3610 LDA#25:JSRo:LDA#5:JSR  
 0  
 3620 LDA#184:JSRo:LDA#1:JS  
 Ro  
 3630 LDA#192:JSRo:LDA#2:JS  
 Ro  
 3640 LDA#25:JSRo:LDA#4:JSR  
 0  
 3650 LDA#120:JSRo:LDA#2:JS

Ro  
 3660 LDA#228:JSRo:LDA#1:JS  
 Ro  
 3670 LDA#25:JSRo:LDA#5:JSR  
 0  
 3680 LDA#64:JSRo:LDA#3:JSR  
 0  
 3690 LDA#64:JSRo:LDA#2:JMP  
 0  
 3700 .erkey INCkeyco+1  
 3710 LDAkeyco+1:CMKeyco:0  
 NEerkey1:LDA#1:STAleave  
 3720 .erkey1 LDA#31:JSRo:L  
 DA#12:JSRo:LDA#23:JSRo  
 3730 LDAkeyco+1:CLC:ADC#48  
 :JSRo  
 3740 LDX#so MOD256:LDY#so  
 DIV256:LDA#7:JMP#FFF1  
 3750 .dr\_map LDA#09:STA#7  
 3  
 3760 LDA#74:STA#72  
 3770 LDX#1:LDY#31  
 3780 LDA#78:CLC:ADC#48:ST  
 A#78  
 3790 LDA#71:ADC#1:STA#71  
 3800 .dr\_map1 LDA#72),Y  
 3810 EOR#78),Y  
 3820 STA#78),Y  
 3830 DEY:BPLdr\_map1  
 3840 LDA#72:CLC:ADC#32:STA  
 #72  
 3850 LDA#78:ADC#48:STA#78  
 3860 LDA#71:ADC#1:STA#71  
 3870 LDY#31:DEX:BPLdr\_map1  
 :RTS  
 3880 .mapso LDA#38:STA#78  
 3890 LDA#7A:STA#71  
 3900 JSRdr\_map:LDA#1:STA#  
 p  
 3910 LDX#so1 MOD256:LDY#so  
 1 DIV256:LDA#7:JSR#FFF1:LDY  
 #8:RTS  
 3920 1:NEXT:ENDPROC  
 3930 DEFPROCdraw  
 3940 GCOL0,3:FOR#1=1TO24ST  
 EPB  
 3950 JI=1/2  
 3960 MOVE16+II,B+JI:DRAW12  
 63-JI,B+JI:DRAW1279-II,B+JI  
 :DRAW1279-II,1015-JI:DRAW12  
 63-II,1023-JI:DRAW16+II,102  
 3-JI:DRAW8+II,1015-JI:DRAW8  
 +II,B+JI:DRAW16+II,B+JI  
 3970 NEXT  
 3980 GCOL0,1:MOVE248,688  
 3990 DRAW248,476:DRAW32,4  
 76  
 4000 DRAW32,576:DRAW32,7

84  
 4910 DRAW448,784:DRAW249,6  
 88  
 4920 COLOURS  
 4930 PROCa(5,23,"Keys -")  
 :PRINTTAB(12,23);keyco?1;"  
">";?keyco  
 4940 PROCa(5,21,"Score -")  
 4950 PRINTTAB(12,21);sc1  
 4960 PROCa(5,25,"Lives -")  
 4970 PRINTTAB(12,25);li1  
 4980 PRINTTAB(6,3);:PROCb("Maze Man")  
 4990 PROCa(6,5,"---- ---")  
 :GCOL0,1  
 4100 IF?map=1 CALLmapso  
 4110 ENDPROC  
 4120 DATA#3FFFFE,&38F786,&  
 266332,&2F367A,&2F887A,&263  
 E32,&38A286,&382A8E,&2BEBEA  
 ,&28082A,&23FFE2,&28082A,&2  
 BEBEA,&382A8E,&38A286,&263E  
 32,&2F887A,&2F367A,&266332,  
 &38F786,&3FFFFE  
 4130 DATA#3FFFFE,&280802,&  
 2FF7FA,&28148A,&28C1AA,&2BF  
 FAA,&2AB8AA,&2AFEEA,&2A42AA  
 ,&285AAA,&2252A2,&2ADEAA,&2  
 A48AA,&287FAA,&28112A,&28C4  
 6A,&2BFFEA,&28088A,&2FF7FA,  
 &280802,&3FFFFE  
 4140 DATA#3FFFFE,&280802,&  
 2D5BBA,&25498A,&2D593A,&25C  
 922,&248922,&2C993A,&280802  
 ,&3FFFFA,&22288A,&2A888A,&2  
 288A,&2A888A,&2AABFA,&288A  
 8A,&2AAAAAA,&2AAAAAA,&2AAAAAA,  
 &2228A2,&3FFFFE  
 4150 DEFPROCread  
 4160 RESTORE(4120+maze1)  
 4170 FOR#1=BT02#1:READ#1:FO  
 R#1=1TO21:#1=A1DIV2:#(maze1  
 +II#21+JI)=A1MOD2:NEXT,  
 4180 RESTORE4210  
 4190 FOR#1=BT01#1:READ#1:#1  
 ?#988=A1:NEXT  
 4200 ENDPROC  
 4210 DATA#8,&64,&88,&65,&  
 29,&65,&10,&66,&38,&66,&58,  
 666,&48,&67,&68,&67,&88,&67  
 4220 DATA15,15,15,15,15,14  
 ,12,8,15,14,12,8,8,8,8,8  
 4230 DATA255,255,255,255,2  
 39,287,143,15,239,287,143,1  
 5,15,15,15,15  
 4240 DATA8,8,8,8,17,51,119  
 ,255,17,51,119,255,255,255,  
 255,255



4258 DATA0,0,0,0,0,0,0,0,  
 ,0,0,0,0,17,51,0,0,0,0,0,  
 0,238,236,0,0,0,0,0,0,0  
 4260 DATA0,0,0,0,0,0,0,0,  
 ,7,39,7,22,3,103,15,62,38,9  
 4,38,158,63,127,15,128,128,  
 128,128,0,136,288,192  
 4270 DATA 16,1,33,3,67,22,  
 22,22,15,15,75,195,131,1  
 31,3,15,15,15,45,68,68,68,  
 6,192,72,184,44,68,22,22,22  
 4280 DATA0,0,0,0,17,1,1,  
 3,67,7,7,143,158,68,68,61,6  
 2,38,38,38,23,3,3,0,0,0,0,2  
 84,288,72,72  
 4290 DATA0,0,0,0,16,3,3,  
 68,68,68,68,68,68,44,3,3  
 ,3,3,3,3,3,3,192,192,192,19  
 2,192,224,44,44  
 4300 DEFPROC<sub>re\_spr</sub>  
 4310 RESTORE4220  
 4320 FORI=0TO255:READAI:I  
 I?&C00=A1:NEXT  
 4330 ENDPROC  
 4340 DEFPROC<sub>re\_spr1</sub>  
 4350 RESTORE4440  
 4360 FORI=0TO159:READAI:I  
 I?&914=A1:NEXT  
 4370 ENDPROC  
 4380 DATA51,103,71,71,71,7  
 1,103,51  
 4390 DATA238,63,31,31,31,3  
 1,63,110  
 4400 DATA17,17,17,17,17,17  
 ,58,58  
 4410 DATA76,76,196,196,196  
 ,196,226,226  
 4420 DATA50,50,50,116,116,  
 116,116,51  
 4430 DATA226,226,226,241,2  
 41,241,241,238  
 4440 DATA0,0,0,0,0,0,0  
 4450 DATA0,0,0,0,0,0,0  
 4460 DATA0,0,0,0,0,0,0  
 4470 DATA0,0,0,0,2,7,38  
 4480 DATA 0,3,22,118,118,1  
 83,127,255  
 4490 DATA0,0,6,12,237,253,  
 223,255  
 4500 DATA1,17,17,29,89,219  
 ,159,255  
 4510 DATA100,252,244,244,2  
 44,244,244,24  
 4520 DATA255,255,119,0,0,0  
 ,0,0  
 4530 DATA255,255,255,0,0,0  
 ,0,0  
 4540 DATA255,255,255,17,17

,17,17,0  
 4550 DATA244,244,244,244,2  
 44,108,284,136  
 4560 DEFPROC<sub>key</sub>:IF?keyco<9  
 ?keyco=?keyco+1  
 4570 mazeI?24=2:mazeI?212=2  
 4580 IFmazeyI=0 mazeI?158=5  
 ELSE mazeI?280=5  
 4590 FORI=1TO?keyco  
 4600 IZ=RND(448)  
 4610 IFmazeI?IZ(>0 GOTO468  
 0 ELSE mazeI?IZ=3  
 4620 NEXT  
 4630 IZ=RND(448)  
 4640 IFmazeI?IZ(>0 GOTO463  
 0 ELSE mazeI?IZ=4  
 4650 ENDPROC  
 4660 DEFPROC<sub>drmap</sub>:SOUND1,I  
 ,100,10  
 4670 VDU19,1,4;0;0;0;:VDU1  
 9,0,3;0;0;0;  
 4680 VDU23,224,0,0,0,0,0,0  
 ,0,0  
 4690 VDU23,225,255,255,255  
 ,255,255,255,255,255  
 4700 VDU23,226,24,68,24,12  
 6,153,36,36,36  
 4710 VDU23,227,0,2,5,253,1  
 65,2,0,0  
 4720 VDU23,229,24,68,68,24  
 ,68,68,126,126  
 4730 VDU29,8,31,28,4  
 4740 FORI=mazeI+1TOmazeI+441:VDU224+?I:I:NEXT  
 4750 ?dead=0:PRINT ''TAB(5)  
 ;''PRESS SPACE''!REPEATUNTIL1  
 NKEY-99:ENDPROC  
 4760 DATA0,0,0,0,16,48,97,

210  
 4770 DATA0,0,0,176,105,2  
 10,100  
 4780 DATA0,0,0,112,225,2  
 10,100  
 4790 DATA0,0,0,112,225,1  
 95,135  
 4800 DATA253,175,175,175,1  
 75,142,140,136  
 4810 DATA191,175,175,175,1  
 91,175,175,170  
 4820 DATA191,175,175,175,1  
 91,175,175,170  
 4830 DATA143,143,143,142,1  
 40,9,0,0  
 4840 DEFPROC<sub>level</sub>  
 4850 CLS:PROCcls:PROCcls  
 4860 mazeyI=mazeyI+10  
 4870 IFmazeyI=30 mazeyI=0  
 4880 scI=scI+(?keyco+10)  
 4890 IFRND(3)=1 ?&87=?&87-  
 1:IF?&87<2 ?&86=2  
 4900 IFRND(6)=1 ?&86=2:?=8  
 6=?&86-1:IF?&86<2 ?&86=2  
 4910 ENDPROC  
 4920 DEFPROC<sub>var</sub>  
 4930 ?&76=(mazeI+1) MOD256  
 4940 ?&77=(mazeI+1) DIV256  
 4950 ?&74=(mazeI+24) MOD25  
 6  
 4960 ?&75=(mazeI+24) DIV25  
 6  
 4970 ?&7E=(mazeI+212) MOD2  
 56  
 4980 ?&7F=(mazeI+212) DIV2  
 56  
 4990 ?xenemy=2:?yenemy=11  
 5000 ?dead=0  
 5010 ?xman=3:?yman=2

5020 ?xtople=2:?ytople=1  
 5030 ?xbotri=4:?ybotri=3  
 5040 mazeI?24=2  
 5050 ENDPROC  
 5060 DEFPROCcls  
 5070 FORI=0TO10:SOUND1,3,  
 00+I\*4,1:VDU28,1+I,19+I,  
 19+I,12-I:COLOUR128+I:CL  
 S:COLOUR128+I+1:CLS:K=INKE  
 Y3:NEXT  
 5080 FORI=1TO8STEP-1:SOU  
 ND1,2,80+I\*4,1:VDU28,1+I,  
 19+I,19-I,12-I:COLOUR128  
 +I:CLS:COLOUR128+I+1:CLS:  
 K=INKEY3:NEXT  
 5090 VDU28,26:CLS  
 5100 ENDPROC  
 5110 DEFPROCb(A\$):FORI=1T  
 OLEN A\$:?&90=ASC(MID\$(A\$,I  
 ,1)):AI=10:IZ=&98:YI=0:CALL  
 &FFFL:FORJX=0TO1:VDU23,225:  
 FORKZ=2TO9:VDU?(&98+4+JZ+KZ  
 DIV2):NEXT:VDU225,10,0:NEXT  
 :VDU11,11,9:NEXT:ENDPROC  
 5120 DEFPROCa(AZ,BI,A\$):PR  
 INTTAB(AZ,BI);A\$:VDU5:MOVEA  
 I#64-B,1016-BI#32:PRINTA\$:V  
 DU4:ENDPROC  
 5130 DEF PROCi:VDU19,3,4,  
 0;B;B;  
 5140 COLOUR2:6COLB,3  
 5150 PROCa(0,5,"YOU ARE IN  
 THE TOP 5")  
 5160 COLOUR2:6COLB,1:PROCa  
 (0,6,"-----")  
 5170 COLOUR2:PROCa(5,10,"E  
 NTER NAME")  
 5180 COLOUR1:PROCa(5,13,"-  
 -----")  
 5190 COLOUR3:INPUTTAB(5,12  
 )S\$  
 5200 S\$=LEFT\$(S\$,10):HI\$(7  
 )=S\$:HI\$(7)=scI  
 5210 FORI=0TO1STEP-1  
 5220 IFHI\$(7)>HI\$(I) HI\$(I  
 +1)=HI\$(I):HI\$(I+1)=HI\$(I):  
 HI\$(I)=HI\$(7):HI\$(1)=HI\$(7)  
 5230 NEXT:CLS:ENDPROC  
 5240 DEFPROC<sub>hi\_sc</sub>  
 5250 COLOUR2  
 5260 PRINTTAB(5,2)::PROCb(  
 "HI SCORES")  
 5270 PROCa(5,4,"-----")  
 )

## Maze listing

### From Page 59

```

5280 FORI=4TO20STEP4
5290 PROCa(1,5+I,STR$(I/4)
+"")
5300 COLOUR2:GCOLB,3
5310 PROCa(4,5+I,HI$(I/4))
5320 GCOLB,1
5330 PROCa(15,5+I,STR$HI$(I/4))
5340 NEXT:COLOUR2:VDU19,3,
5,0;0;0;
5350 PRINT "SPC(4);:PROCb(
"Press Space")
5360 REPEATUNTILINKEY-99:C
LS:ENDPROC
5370 DEFPROCive
5380 FORI=17TO100STEP-20
5390 CALLsave:SOUND1,-15,1
,4
5400 NEXT:CALLsave
5410 CLS:PROCc1s:PROCc1s
5420 I1I=I1I-1
5430 ?dead=0
      
```

5440 ?((7&75\*256)+7&74)=0

5450 ?((7&7F\*256)+7&7E)=0

5460 ENDPROC

5470 DEFPROCinit

5480 DIMH1\$(7):DIMH1\$(7)

5490 FORI=1TO5:H1\$(I)=(5-I
)\*28:H1\$(1)="STEVIE":NEXT

5500 mazeI=6A00

5510 DIMQ1 1800

5520 xman=67A:yman=67B:xen

emay=67C:yemay=67D

5530 enem ypos=67E:manpos=6
74:pointer=676

5540 xtople=680:ytople=681

5550 xbotri=682:ybotri=683

:o=6FFEE

5560 ENVELOPE1,1,20,10,40,

10,30,10,126,0,0,-126,126,1
26

5570 ENVELOPE2,1,100,-20,1
0,100,15,30,126,0,0,-126,12
6,126

5580 ENVELOPE3,1,5,-5,5,3,

6,9,126,0,0,-126,126,126

```

5590 ENDPROC
      
```

5600 DEFPROCins:VDU23,1,B;

0;0;0;

5610 VDU19,1,3,0;0;0;:VDU1
9,0,4,0;0;0;

5620 PRINTTAB(16,1);:PROCb(
"MAZE MAN")

5630 DRAW1279,0:DRAW1279,1

023:DRAW0,1023:DRAW0,0:MOVE

0,916:DRAW1279,916

5640 VDU28,1,38,38,4

5650 PRINT"You are an adve
nturer lost in a maze." "T
he way to escape to the nex
t maze is" "to collect all
the keys and take them" "
to the keyhole at the centr
e. There is"

5660 PRINT" a guardian who
will seek to destroy" "
you and must be avoided. On
ly 1/49th" "of each maze i
s displayed at a time." "T
o see the complete maze you

must find" "the map and pr
ess the SPACE BAR." "Your
controls are" "

```

5670 PRINT TAB(8)"l - left
      l - right" "TAB(8)"u -
      UP      / - down"
      5680 PROCinit:PROCensemble
      :SOUND1,1,100,10
      5690 PRINT TAB(14);:PROCb(
"PRESS SPACE")
      5700 REPEATUNTILINKEY-99:E
      NDPROC
      5710 DEFPROCdload
      5720 KEYB #T:INFORI=PAGE
      TO TOP STEP4:!(&E88+AI-PAG
E)=!AI:NEXT:PA.=#E88!HOLDIM
      RUNIM
      5730 #FI138,0,128
      5740 ENDPROC
      
```

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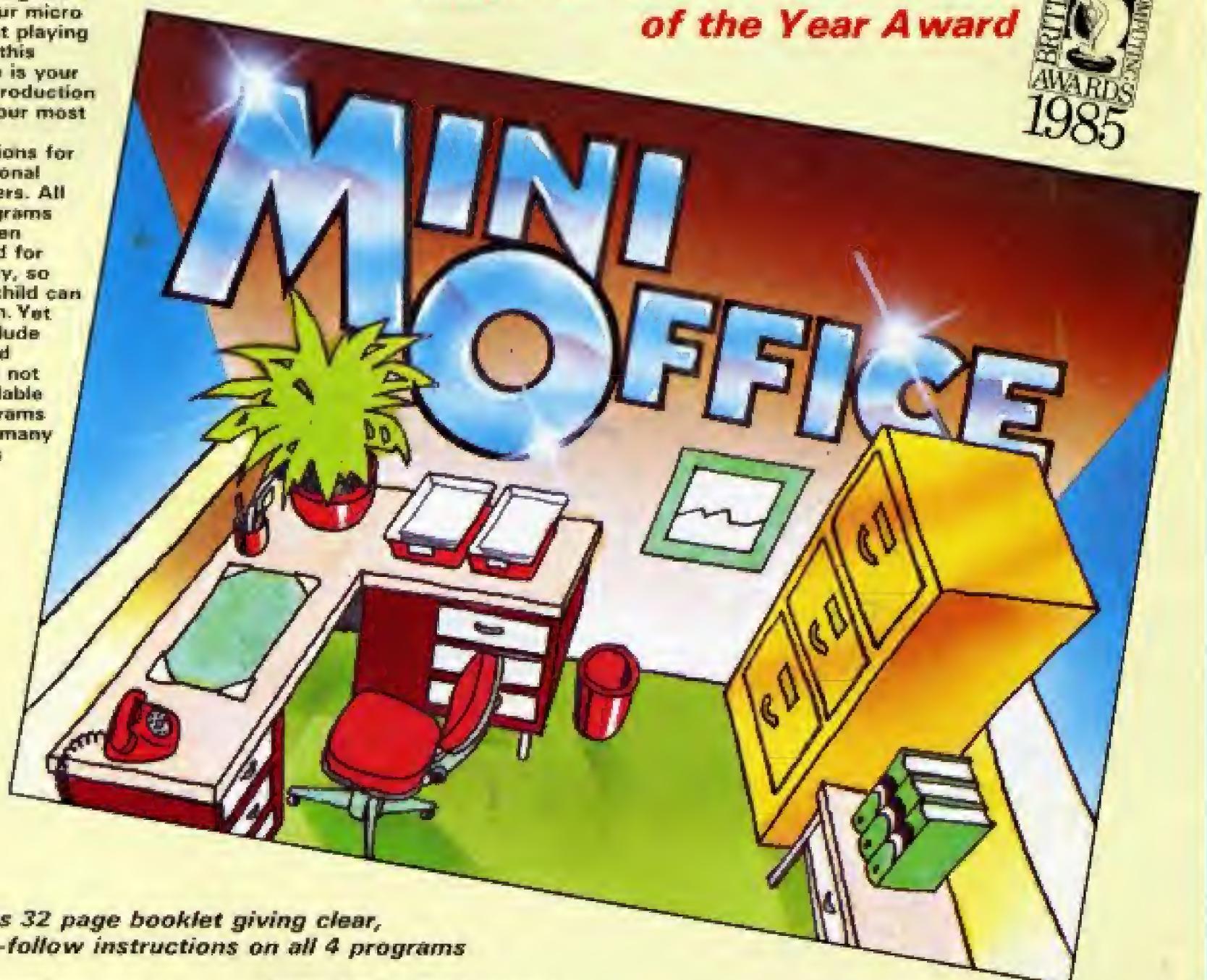
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